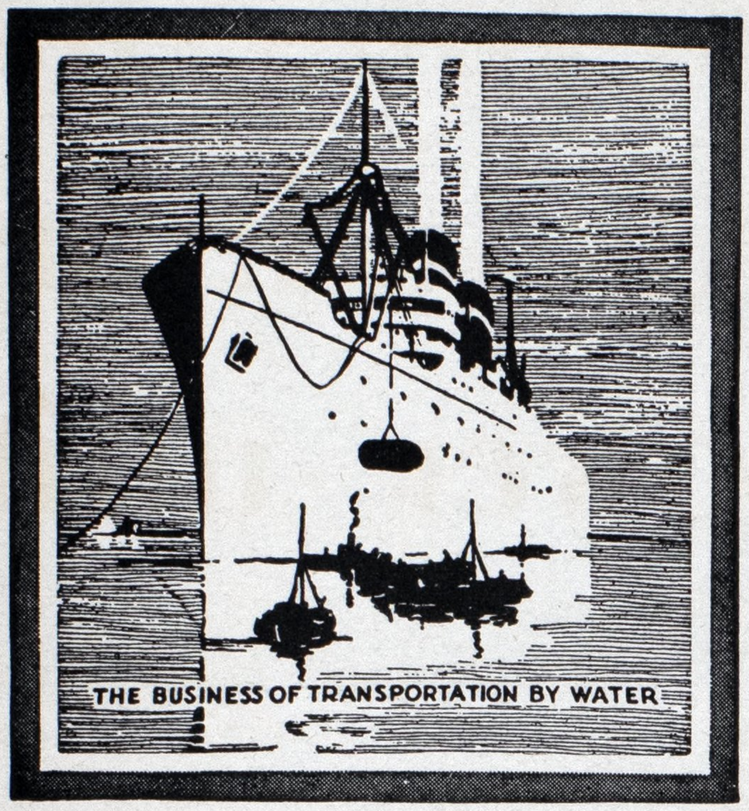
Marine Review

The National Publication Covering the Business of Transportation by Water

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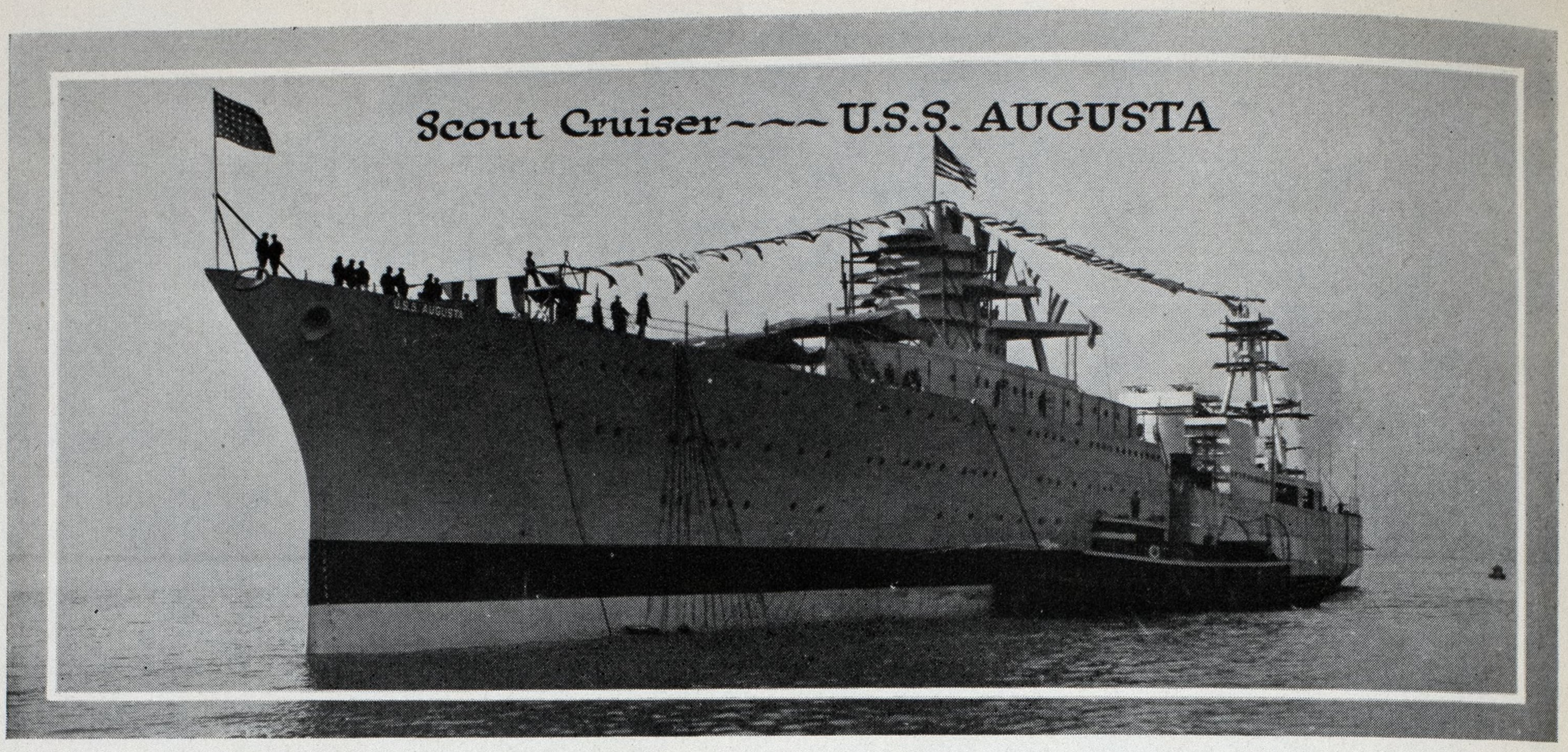
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American Shipyards Are Busier Than Any Time Since War

PROMISE of improvement in shipbuilding in the United States noted in our annual review a year ago has been more than fulfilled. In fact so definite is this improvement that the shipbuilders themselves are optimistic about present and future prospects. H. G. Smith, president of the National Council of American shipbuilders in a recent statement pointed out that at the end of 1929 there were 28 new ships on order in American yards, one of which has already been delivered and another nearly completed. Thirteen of these are for operation in foreign trade. He continued to say that mail contracts recently awarded by the postmaster general call for building 25 or 30 additional ships, all for the foreign trade and when these are completed replacements are bound to be needed in the coastwise fleets. Also since there are not likely to be fewer American vessels on the sea in the future than at present, Mr. Smith concluded, it will be necessary, in order to keep this number in operation, to build about 50 new ships each year, so that there is certain to be ample work for American yards. This considered statement by the chief representative of all of the leading American shipyards may be safely taken at its face value. From time to time in MARINE REVIEW, beginning in the November 1928 issue, corrected and brought up to date in the June 1929 and January 1930 issues, complete summaries have been published of mail contracts awarded and bids on additional mail contracts proposed, all based on the provisions of the merchant marine act of 1928. On page 89 of the present issue will be found an outline of additional mail contracts recently awarded including those two most important services across the Atlantic between New York, Cherbourg and Southampton and New York, Plymouth, Cherbourg and Hamburg,

Motive Power Compared—Two Years

Types	No. 1929	No. 1928	Per Cent 1929	Per Cent 1928
Steam reciprocating coal burner	18	19	12.4	20.6
Steam reciprocating oil burner	15	7	10.3	7.6
Steam turbine coal burner	1	1	0.7	1.1
Steam turbine oil burner	15	4	10.3	4.4
Diesel engine direct drive	52	31	35.9	33.7
Diesel engine electric drive	28	19	19.3	20.6
Turbine electric oil burner	14	9	9.7	9.8
Turbine electric coal burner	2	2	1.4	2.2
Totals	**145**	**92**	**100.0**	**100.0**

Recapitulating for Primary Power

Types	No. 1929	No. 1928	Per Cent 1929	Per Cent 1928
Steam—As primary power	65	42	44.8	45.6
Diesel—As primary power	80	50	55.2	54.4
Totals	**145**	**92**	**100.0**	**100.0**

Recapitulating for Power at Propeller

Types	No. 1929	No. 1928	Per Cent 1929	Per Cent 1928
Steam—Direct and gears	49	31	33.8	33.7
Diesel—Direct drive	52	31	35.9	33.7
Electric—Steam and diesel	44	30	30.3	32.6
Totals	**145**	**92**	**100.0**	**100.0**

Recapitulation for Fuel

Types	1929	1928	1929	1928
Steam—Burning coal	21	22	14.5	23.9
Steam—Burning fuel oil	44	20	30.3	21.7
Diesel—Diesel oil as fuel	80	50	55.2	54.4
Totals	**145**	**92**	**100.0**	**100.0**

calling, in addition to other vessels, for the building of two super liners of at least 45,000 tons and 28 knots speed to cost approximately $30,000,000 each. Five additional mail contracts were awarded on March 22. These with the five awarded early in March and including the transatlantic lines referred to above call for a total of 22 new ships of 247,000 gross tons to cost approximately $141,500,000. This figure and tonnage of course, include the two super liners referred to. All of these ships must be built in American shipyards and must be completed in from three to not longer than five years.

So much for the evidence that shipbuilding in the United States faces a period of exceptional activity, which will mean the design and construction of ships of such size and power as to rival the largest and fastest foreign vessels afloat or projected. That the two giant liners for the transatlantic service will be built is now assured. It will take some time before all of the negotiations can be completed but considering the amount of preliminary work which has already been done it is reasonable to expect that contracts for building these vessels will be awarded before the end of this year.

Taking stock of all merchant shipbuilding in steel powered vessels of over 100 gross tons or 100 feet in length under way in American shipyards during the calendar year 1929 brings out some interesting facts. On pages 80, 81, 82 are listed by name or hull number, with owner, shipyard, dimensions, power and other data noted, no less than 145 vessels of approximately 427,000 gross tons in this category as compared with 92 vessels for the year 1928, 105 for 1927 and 121 for 1926. This is an increase of more than 57 per cent in number and probably at least 70 per cent in gross tonnage over the previous year. The listing of vessels under construction is of course not complete; it is however, less, not more than the actual. Every effort has been made to make the listing as accurate and as complete as possible both by returns from all shipyards of any size and from practically all the small yards. In addition every other available authoritative source has been used. As in other years an analysis by actual count has been made of types of vessels and the power used. The table on page 21 segregates all of the 145 vessels into classes and type of power giving the number of each. For instance there were 14 ocean going vessels carrying passengers, 13 ocean going tankers, 16 coastal and bay tankers, 7 lake freighters, 20 river towboats, 14 trawlers, etc. Of the total, 18 were powered with steam reciprocating engines and coal burning boilers; 15 with steam reciprocating engines and oil burning boilers; 15 with steam turbine geared drives and oil burning boilers; 52 with diesel engines direct connected; 28 with diesel electric drive; 16 steam turbine electric drive, 14 of which had oil burning boilers

ANALYSIS OF AMERICAN MERCHANT SHIPBUILDING—1929

Types of Vessels	No.	Recip. Coal	Recip. Oil	Turb. Coal	Turb. Oil	Diesel Oil	Die. Elec. Oil	Tur. Elec. Oil	Tur. Elec. Coal
Passenger-Ocean	14				7	1		6	
Passenger-Coastwise	3				2	1			
Passenger-Sound	1	1							
Freighter-Coastwise	2	1		1					
Freighter—Lakes	7	5				2			
Tanker-Ocean	13				4	9			
Tanker-Coast, Bays	16					8	8		
Tanker—Lakes	1		1						
Ferry—Harbors	9		4				5		
Ferry-Bays, Rivers	4	1				2	1		
Carferry-Lakes	3	1							2
Towboat-Harbors	10	2	3			3	2		
Towboat-Rivers	20	6	4			5	3	2	
Dredge-Harbors, Rivers	5				2	2	1		
Fishing-Ocean	14					14			
Special-Ocean	14		1				7	6	
Special-Bays, Rivers	9	1	2			5	1		
Totals	145	18	15	1	15	52	28	14	2

Distinctive Ships--Where to Find Them

Passenger Ships

Name and Service	*Page*
City of New York, Freight and Passengers.....	34
Hualalai, Inter-Island, Passenger and Freight	24
Humuula, Inter-Island, Passenger and Freight	33
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Northland, Seattle-Ketchikan	27
Pennsylvania, Ocean, Passenger and Freight....	25
Santa Clara, Ocean, Passenger and Freight.....	23

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Dwight F. Davis, Western Rivers	31
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Lebrija, Magdalena River	54
Mary Alice, Western Rivers	64
W. W. Fischer, Western Rivers	32

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Ebb and Class, Ocean Trawler	60
Itasca and Class, Coast Guard	44
John Kendall, Fireboat	26

See Pages 80, 81, 82 for Complete Shipyard Record

and two coal burning boilers mechanically stoker fired. In the table on page 20 the motive power in all of the 145 vessels is compared in number and percentage of the whole with the vessels in the same category under construction in American shipyards during 1928. Taking all vessels, from river boats and tugs to ocean liners, solely as individual units, regardless of the size of the propulsion machinery used, it is interesting to note for instance the steady decline in the use of steam reciprocating engines. For the year 1925 over half of all vessels listed or 52.4 per cent had steam reciprocating engines; for 1926 the percentage was 41.3; for 1927, it was 40 per cent; for 1928 it was 28.2 per cent and for 1929 only 22.7 per cent. According to these actual figures the passing of the steam reciprocating engine to a still less significant position in the marine field seems certain. Its practical elimination altogether may not be far off unless some radical improvement in design takes place which is not now forseen by informed marine engineers.

On the other hand diesel direct drive has shown a decided increase from 19.6 per cent for 1925 to 35.9 per cent for 1929; with the intermediate years as follows: 33.7 per cent for 1928; 25.7 per cent for 1927, and 26.5 per cent for 1926. Diesel electric drive has shown an increase from 11.2 per cent for 1925 to 19.3 per cent for 1929. The intermediate years show a fairly even trend and little change with 20.6 per cent in 1928, 17.2 for 1927 and 21.5 for 1926. Turbine electric which is slightly over turbine geared drive has increased from 3.7 per cent for 1925 to 11.1 per cent for 1929; with the intermediate years as follows: 12.0 per cent for 1928; 9.5 for 1927, and 3.3 for 1926. Turbine geared drive according to this particular analysis in which the number of larger vessels under construction in the periods compared must be considered, fell off slightly from 13.1 per cent for 1925 to 11.0 per cent for 1929 with the intermediate years as follows: 5. 5. per cent for 1928; 7.6 for 1927, and 7.4 for 1926.

All of the above comparisons as stated are based on units of individual vessels from the smallest to the largest and does not take into account the power and importance of the main machinery installations. In the engineering, labor and cost involved there is of course no comparison between the 26,500 shaft horsepower twin screw turbine electric main drive on one of the Dollar liners with a 500-horsepower diesel engine in a harbor or river towboat. The same applies to the Matson liners each with a twin screw turbine geared drive of 22,000 horsepower. An analysis of the 145 vessels listed on pages 80, 81, 82 on the basis of number of vessels, total and average gross tonnage corresponding to total and average horsepower for the various types of powers presents a totally different, and in many respects a truer comparison.

In listing 145 widely diversified types of vessels under construction in many different localities and under varied conditions, absolute accuracy in gross tonnage and in horsepower is not to be expected. Also in a very few instances it was necessary to estimate the tonnage. The relative accuracy however, cannot be questioned. Results of this analysis are shown in the table on this page. It was found that the total gross tonnage in reciprocating engine vessels is 67,805 and the total horsepower 48,810. There are 33 vessels of this type or an average of 2055 gross tons and 1480 horsepower per vessel. The total gross tonnage of the 16 turbine geared vessels is 123,914 and the total horsepower is 116,600 or an average of 7745 gross tons and 7290 horsepower per vessel. There are 16 turbine electric vessels of 110,553 gross tons and total horsepower of 151,280, or an average of 6910 gross tons and 9455 horsepower per vessel.

Now we come to the standing of the diesel. Of the 145 vessels listed 52 are diesel direct drive with a total gross tonnage of 108,139 and a total horsepower of 53,014 or an average of 2080 gross tons and 2910 horsepower per vessel. There are 28 diesel electric vessels of 16,976 gross tons and total horsepower of 19,025, or an average of 606 gross tons and 680 horsepower per vessel.

From this analysis it will be noted that the turbine electric and turbine geared drives greatly predominate in individual size of vessel and amount of power. Also that the total gross tonnage in which steam is used as primary power is 302,272 as compared with 125,118 for the diesel as primary power or 70.8 per cent for steam as compared with 29.2 per cent for diesel. Total horsepower in steam is 316,690 as compared with 72,039 in diesel or 81.5 per cent for steam as compared with 18.5 per cent for the diesel.

Among the important vessels on which some work was done before the end of 1929 though the keels were not laid are the two turbine electric ocean liners for the Dollar Steamship lines. These vessels are 654 feet 3 inches in length, 81 feet in beam and of 21,900 gross tons. The shaft horsepower will be 26,500 in twin screws and a speed of 21 knots is expected. They are now under construction at Newport News Shipbuilding & Dry Dock Co. Also two twin screw turbine geared ocean liners for the Matson Navigation Co. for the San Francisco-Sydney run. These vessels are 631 feet 6 inches in length, 79 feet in beam and of 17,500 gross tons. The shaft horsepower will be 22,000 and a speed of 20½ knots is expected. They are being built at the Fore River plant of the Bethlehem Shipbuilding Corp.

In addition to the merchant work outlined in this review a considerable number of elaborate yachts at a cost of over $25,000,000 were built in American shipyards during 1929, according to Joseph A. MacDonald, president of Henry J. Gielow Inc.

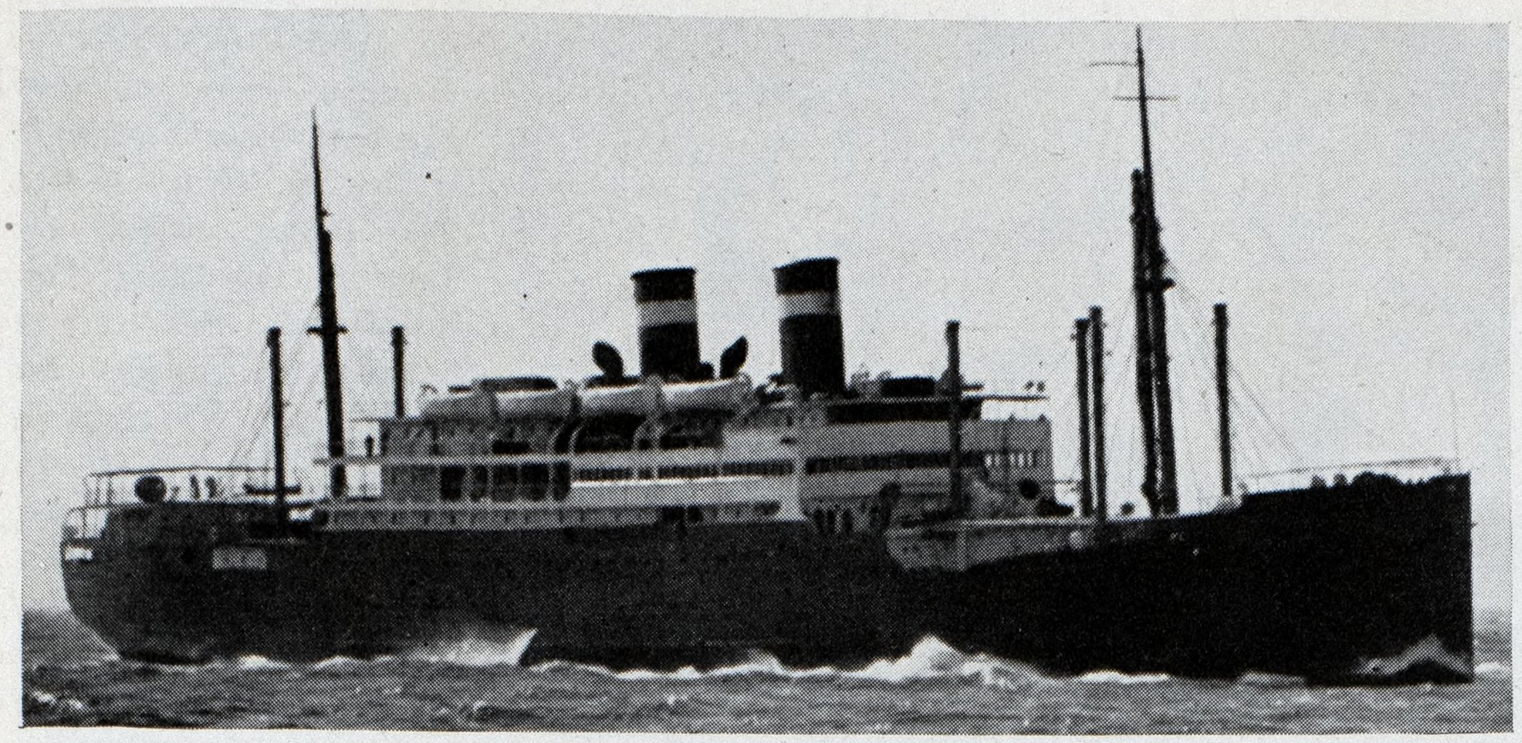
Work for the navy has also been under way in three of the larger shipyards. The AUGUSTA and HOUSTON at Newport News; the SALT LAKE CITY (completed) the CHESTER (ready for trials late in April), and Light Cruiser No. 35 (keel recently laid or about to be laid), at the New York Shipbuilding Co.; the NORTHAMPTON (ready for trials April 15) and the Light Cruiser No. 33 (keel recently laid) at the Fore River plant, Bethlehem Shipbuilding Corp.

Of the 145 vessels listed, 27 have been selected (representing 38 due to duplications) as outstanding and distinctive. Each one of these vessels is illustrated and described in all important details in the following pages, one vessel to each page. These pages of distinctive ships give a true picture of American shipbuilding of the present time and this compilation of authoritative information may be of use to shipowner, naval architect and marine engineer.

Analysis of Power and Gross Tonnage of Vessels Listed on Pages 80-81-82

Type of Power	Number of Vessels	Total Gross Tons	Total Horsepower	Average Gross Tons	Average Horsepower
Turbine Electric.	16	110,553	151,280	6910	9455
Turbine Gears...	16	123,914	116,600	7745	7290
Reciprocating...	33	67,805	48,810	2055	1480
Diesel Electric...	28	16,976	19,025	606	680
Diesel Direct....	52	108,139	53,014	2080	2910
Totals.....	145	427,387	388,729	2947	2681

SANTA CLARA—Passenger Ocean Liner—Twin Screw—Electric



Name—SANTA CLARA
Owner—Grace Line Inc.
Builder—New York Shipbuilding Co.
Naval Architect—E. H. Rigg
Launched—Nov. 14, '29, completed April 1, '30
Classification—American Bureau and Lloyds

HULL PARTICULARS

Length over all, 505 feet ½ inch; length between perpendiculars, 482 feet 9 inches; breadth molded, 63 feet 9 inches; depth molded, 37 feet 3 inches; draft, 25 feet 2 13/16 inches; displacement loaded, 14,567 tons; gross tonnage abt., 9500; net tonnage abt., 5700; passenger capacity first class, 208; no second or third class carried; cargo capacity in cubic feet about, 345,000; bunker fuel capacity in tons, 2100; speed in service, 18 knots.

MACHINERY PARTICULARS

Main Engines — Turbine electric propulsion machinery supplied by General Electric Co.; a twin screw installation with a total of 12,600 shaft horsepower at 120 revolutions per minute of the propellers. There are two A.C. turbine generating sets each with a normal rating of 4850 kilowatts, 3-phase, 3000 volts direct connected to a turbine running at 3000 revolutions per minute. Two main propulsion motors of 3-phase synchronous induction type each with a normal rating of 6300 shaft horsepower at 120 revolutions per minute.

Boilers—Six, Babcock & Wilcox marine water tube type with a total heating surface of 28,800 square feet, and 2592 square feet of superheating surface; working pressure, 300 pounds; fuel, oil; oil burners and feed water regulators supplied by Babcock & Wilcox Co.

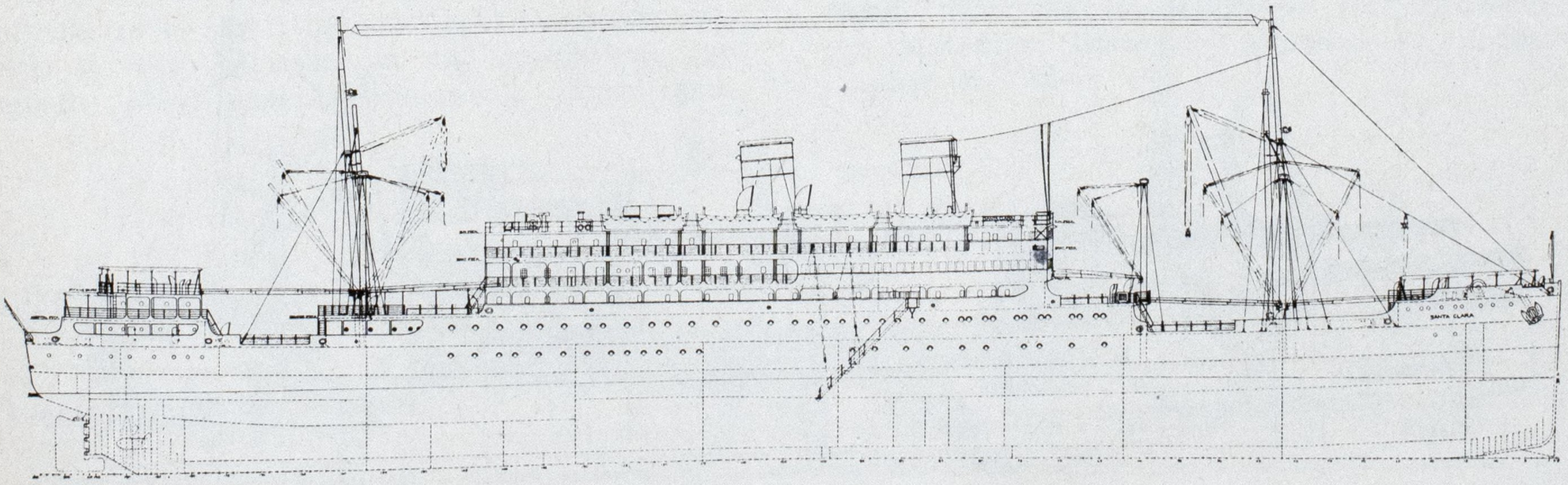
Auxiliary Generators — Four 350 kilowatts, 240 volts turbine generators supplying current for lighting and for 950 horsepower in electric motors for deck and engine room auxiliaries.

DESCRIPTION

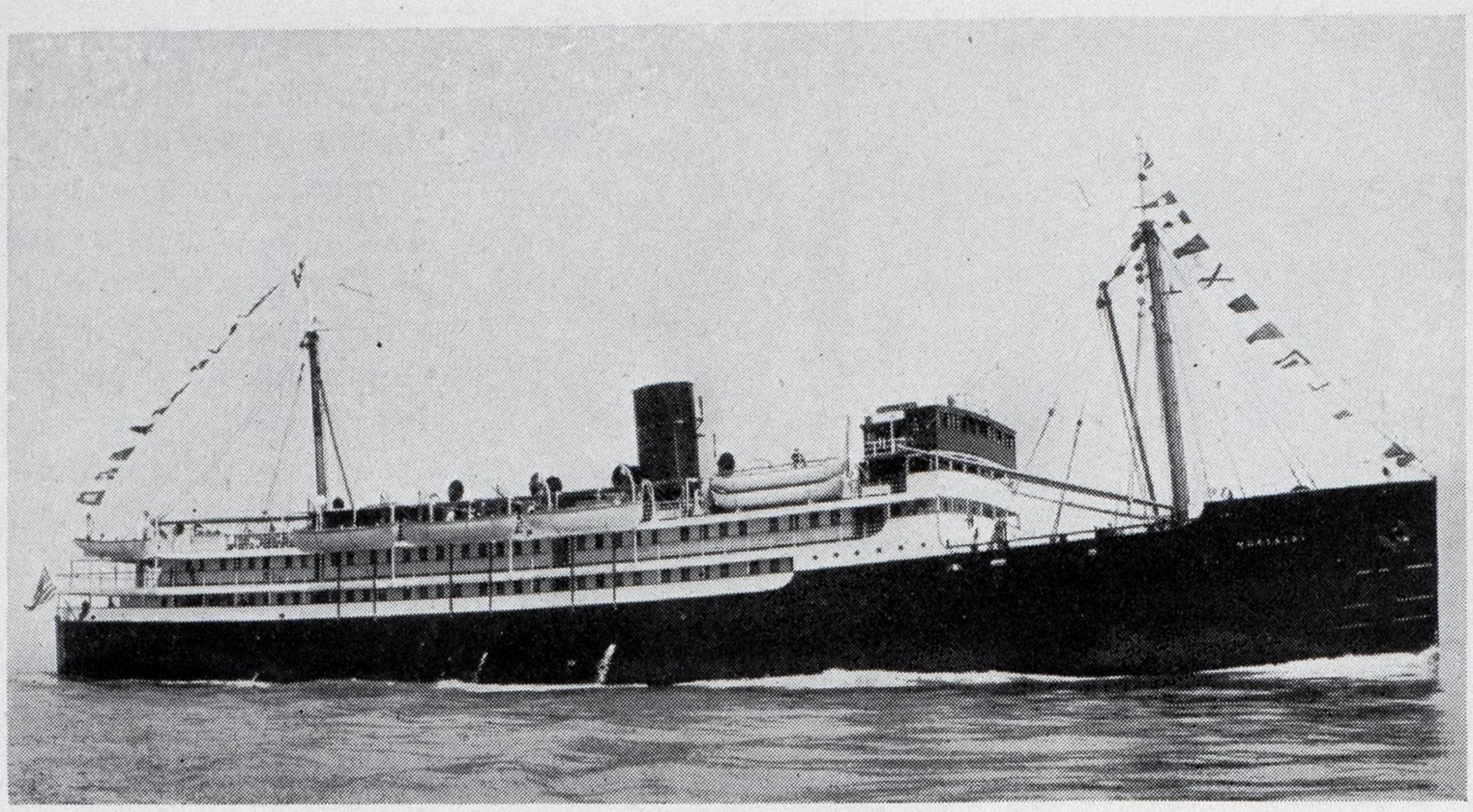
On her trials the SANTA CLARA developed a maximum speed of 22 knots and averaged 19.55 knots. Two electric motors each direct connected to a propeller receive current from two turbine driven generators. Her passenger accommodations and public rooms in design and workmanship are well done.

AUXILIARY EQUIPMENT

Pumps—Worthington; Cameron; Warren
Windlass—Hyde Windlass Co.
Warping Winches—Hyde Windlass Co.
Cargo Winches—New York Shipbuilding Co.
Steering Gear—Hyde; Waterbury Tool Co.
Refrigeration—Brunswick-Kroeschell
Electric Motors—General Electric Co.
Revolution Counters—Cummings Mach. Works
Soot Blowers—Diamond Power Specialty Corp.
Hardware—H. S. Getty & Co. Inc.
Rubber Flooring—Goodyear Tire & Rubber Co.
Deck Covering—Selby, Battersby & Co.
Blowers—B. F. Sturtevant Co.
Windows—Kearfott Engineering Co.
Anchor Chain—National Malleable Co.
Oil Purifiers—Sharples Specialty Co.
Gyro Compass—Sperry Gyroscope Co.
Gyro Pilot—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Depth Finder—Submarine Signal Co.
Life Boats & Davits—Welin Davit



HUALALAI—Passenger—Inter-Island—Twin Screw—Steam



Name——HUALALAI
Owner—Inter-Island Steam Navigation Co.
Builder—Bethlehem S. B. Corp., Union Plant
Naval Architect—E. P. McRitchie
Launched—Mar. 23, '29; completed, June 4, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 310 feet 10 inches; length between perpendiculars, 295 feet; breadth molded, 48 feet; depth molded to shelter deck, 27 feet 6 inches; draft, 17 feet 7⅞ inches; displacement loaded, 4366 tons; gross tonnage, 3088; net tonnage, 1803; deadweight capacity, 1800 tons; passenger capacity, first class, 212, second class, none, third class, 96; cargo capacity in cubic feet, 85,897; bunker fuel oil capacity in gallons, 156,225; speed, 15 knots.

MACHINERY PARTICULARS

Main Engines—Two complete expansion, combined impulse reaction type, turbines each developing 2000 shaft horsepower at 3600 revolutions per minute and 135 revolutions of the shaft. Each turbine is connected to its respective propeller through a single pinion double reduction gear, giving a propeller speed of 135 revolutions per minute. Both turbine and reduction gears were built by Westinghouse.

Boilers—Four, Babcock & Wilcox water tube marine boilers. Total heating surface, 12,268 square feet; total superheating surface, 1044 square feet; working pressure, 280 pounds; fuel, oil; Babcock & Wilcox superheaters and oil burners.

Generating Sets—Two, each single wheel impulse turbine geared 94 kilowatts, direct current built by Westinghouse Electric & Mfg. Co.

AUXILIARY EQUIPMENT

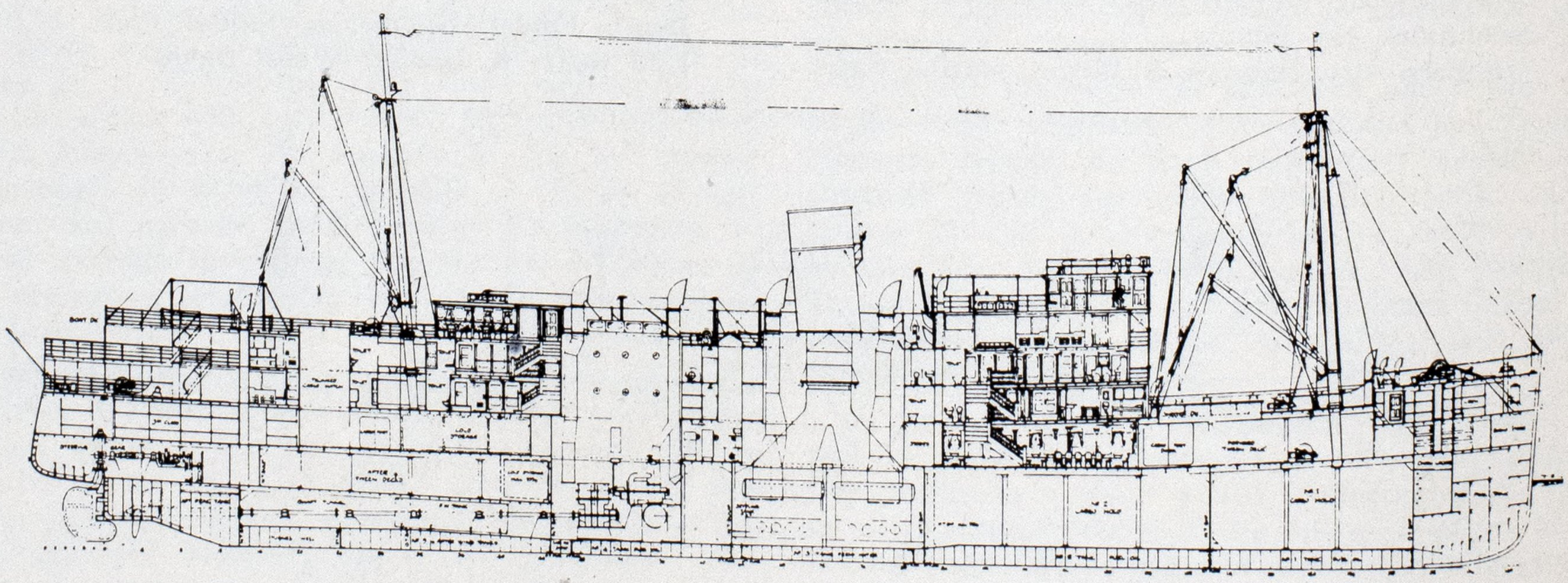
Manufacturers of:

Pumps—Warren Steam Pump Co.
Windlass—Hyde Windlass Co.
Winches—Allan Cunningham Co.
Steering Engine—Hyde Windlass Co.
Refrigeration—York Mfg. Co.
Air Compressor—Westinghouse Air Brake Co.
Lifeboats—Welin Davit & Boat Corp.
Soot Blowers—Diamond Power Specialty Corp.
Blowers—Ilg Electric Ventilating Co.
Thrust Bearings—Kingsbury Machine Works
Searchlights—Sperry Gyroscope Co.
Condensers—Westinghouse Electric & Mfg. Co.

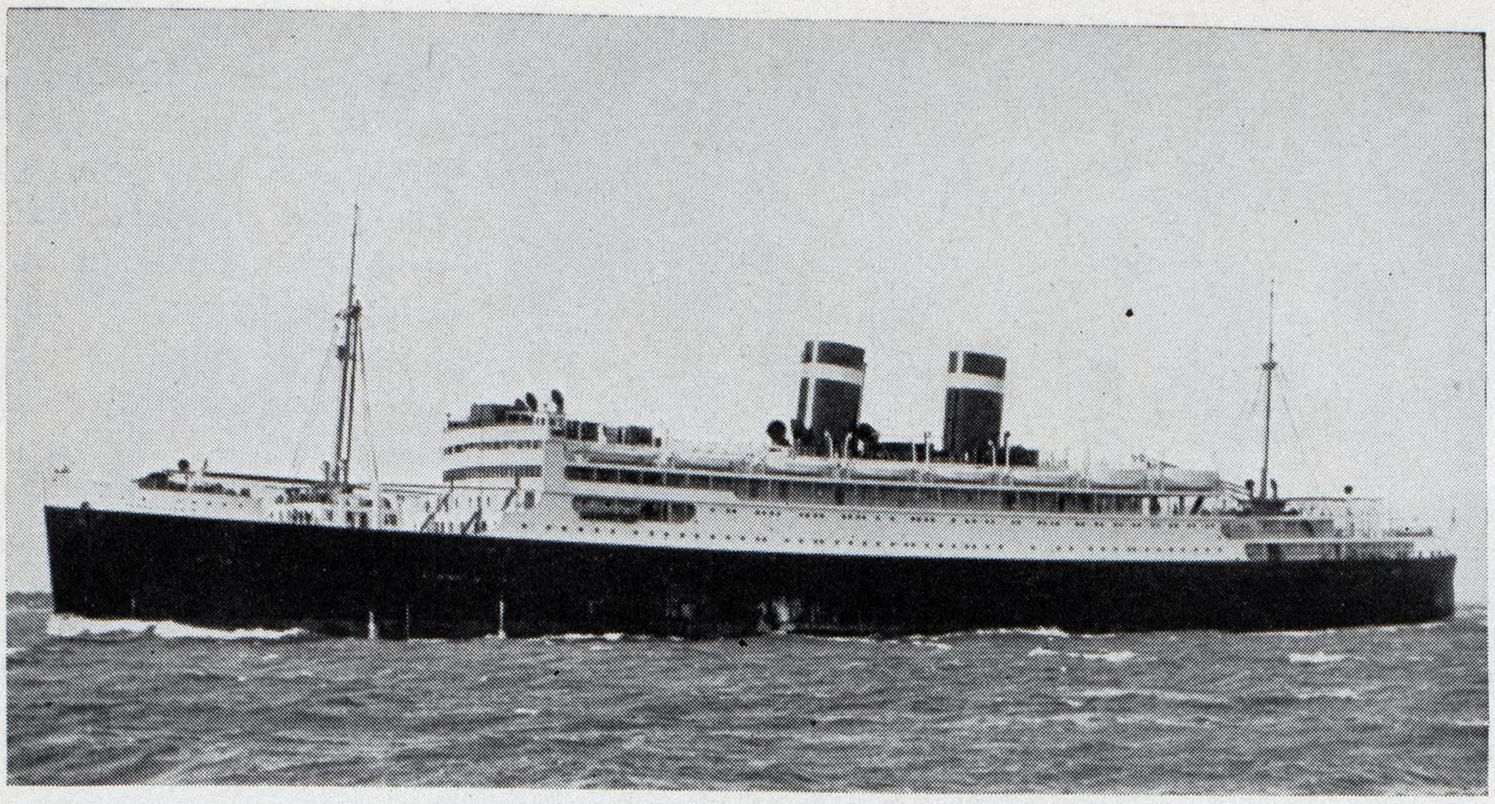
For stateroom bulkheads plywood is used supplied by the Haskelite Mfg. Corp.

DESCRIPTION

A twin screw passenger and freight steamer, sister ship of the WAIALEALE, sailed on June 4, '29 from San Francisco for the Hawaiian islands to enter her regular trade. More than 16 knots speed can be developed. The propelling machinery consists of two geared steam turbines. Passenger accommodations provided for 308.



PENNSYLVANIA—Passenger Ocean Liner—Twin Screw—Electric



Name—PENNSYLVANIA
Owner—Panama Pacific Line (I. M. M. Co.)
Builder—Newport News S. B. & D. D. Co.
Naval Architect—H. F. Norton
Contract—July 5, 1928, keel laid, Oct. 15, 1928
Launched—July 10, '29; completed, Oct. 10, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 613 feet 1 inch; length between perpendiculars, 586 feet; breadth molded, 80 feet; depth molded, 52 feet; draft, 34 feet 3⅞ inches; displacement loaded, 33,375 tons; gross tonnage, 20,526; net tonnage, 12,018; passenger capacity, first class, 402; tourist class, 403; cargo capacity, 10,145 tons; cargo capacity cubic feet, 555,000; bunker fuel oil capacity in tons, 5430; speed, full load, average, 18 knots plus.

MACHINERY PARTICULARS

Main Engines—Turbine electric propulsion machinery, supplied by General Electric Co. Twin screw installation with a total of 17,000 shaft horsepower at 120 revolutions per minute of the propellers. Two alternating current, turbine driven generating sets, each with a normal rating of 5250 kilowatts at 2640 revolutions per minute, 3700 volts, three phase; maximum rating 6600 kilowatts, 4000 volts.

Propulsion Motors—Two, of three phase, synchronous induction type each with a normal rating of 5250 kilowatts at 111 revolutions per minute (6750 shaft horsepower); maximum rating of 6600 kilowatts at 120 revolutions per minute (8500 shaft horsepower). Each main propulsion motor is direct-connected to a propeller of three blades, 18 feet in diameter.

Boilers—Eight Babcock & Wilcox water tube marine boilers with a total heating surface of 43,688 square feet and total superheating surface of 4808 square feet; working pressure, 300 pounds; fuel, oil. Superheaters, oil burning equipment and feed water regulators, all furnished by the Babcock & Wilcox Co.

AUXILIARY EQUIPMENT

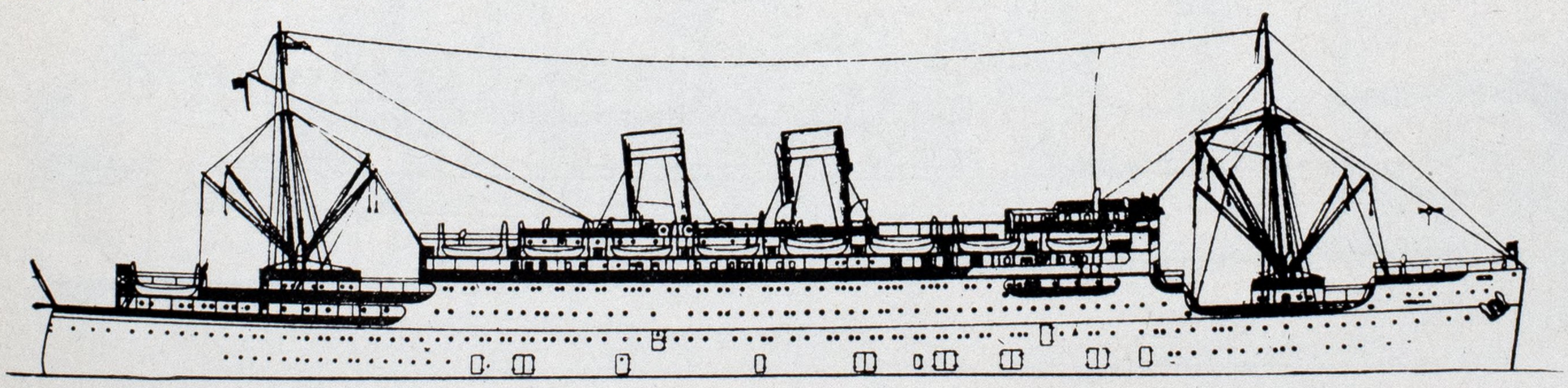
Manufacturers of:

Pumps—Warren, Worthington
Windlass—Hyde Windlass Co.
Winches—Lidgerwood; Shepard
Steering Gear—Electric Hydraulic—Hyde Windlass, Waterbury Tool and General Electric
Propellers—Newport News S. B. & D. D. Co.
Refrigeration—Brunswick-Kroeschell
Electric Motors; Generators—General Electric
Revolution Counters—Cummings Mach. Works
Soot Blowers—Diamond Power Specialty
Batteries—Electric Storage Battery Co.
Windows—Kearfott Engineering Co.
Anchor Chain—National Malleable Co.
Oil Purifiers—Sharples Specialty Co.
Gyro Compass and Pilot Equip.—Sperry
Searchlights—Sperry Gyroscope Co.
Life Saving Equip.—Welin Davit & B. Corp.
Fans—B. F. Sturtevant Co.

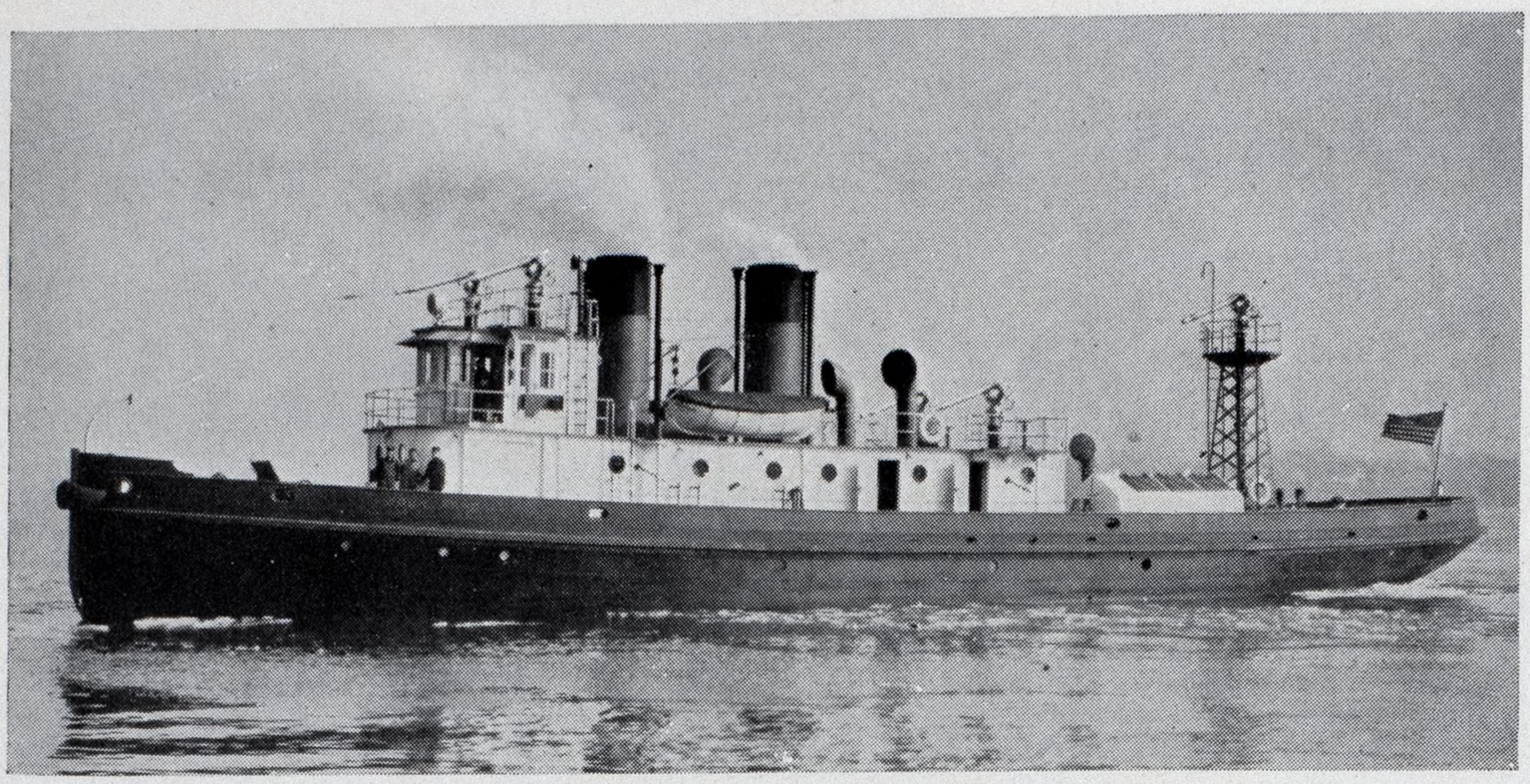
Deck covering for steel and wooden decks was supplied by Goodyear Tire & Rubber Co. and Selby, Battersby Co. Plywood for bulkheads and stateroom partitions, supplied by Roddis Lumber & Veneer Co.

DESCRIPTION

This vessel is similar to the CALIFORNIA and VIRGINIA turned out by the same builder for the same owner. During her 12-hour trial she made better than 19 knots, her best speed being 19.3 knots. The PENNSYLVANIA sailed from New York on her first regular voyage to the West Coast on Oct. 19, last.



JOHN KENDALL—Fireboat—Single Screw—Steam



Name—JOHN KENDALL
Owner—City of Detroit
Builder—Toledo Shipbuilding Co., Inc.
Naval Architect—H. C. Sadler
Launched—Aug. 24, '29; completed, Oct. 12, '29
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 135 feet; length between perpendiculars, 125 feet; breadth molded, 29 feet; depth molded, 15 feet 6 inches; draft, 11 feet; gross tonnage, 347; net tonnage, 159; capacity, two 12-inch, 4-stage centrifugal pumps each capable of delivering 5000 gallons per minute at 200 pounds pressure; two 6-inch, 4-stage centrifugal pumps each capable of delivering 500 gallons per minute at 200 pounds pressure; bunker fuel capacity, 80 tons of oil; speed in service, 14 miles.

MACHINERY PARTICULARS

Main Engine—One, 2-cylinder vertical reciprocating compound steam engine built by the Toledo Shipbuilding Co. Inc. Size 18 x 36 inches x 27 inches stroke; indicated horsepower, 900 at 150 revolutions per minute; this engine is for propulsion and is direct connected to a 9-foot 4-bladed propeller.

Boilers—Two, Babcock & Wilcox water tube marine boilers with a total heating surface of 6362 square feet; working boiler pressure 225 pounds per square inch; fuel, oil; arranged for forced draft with closed stokehold.

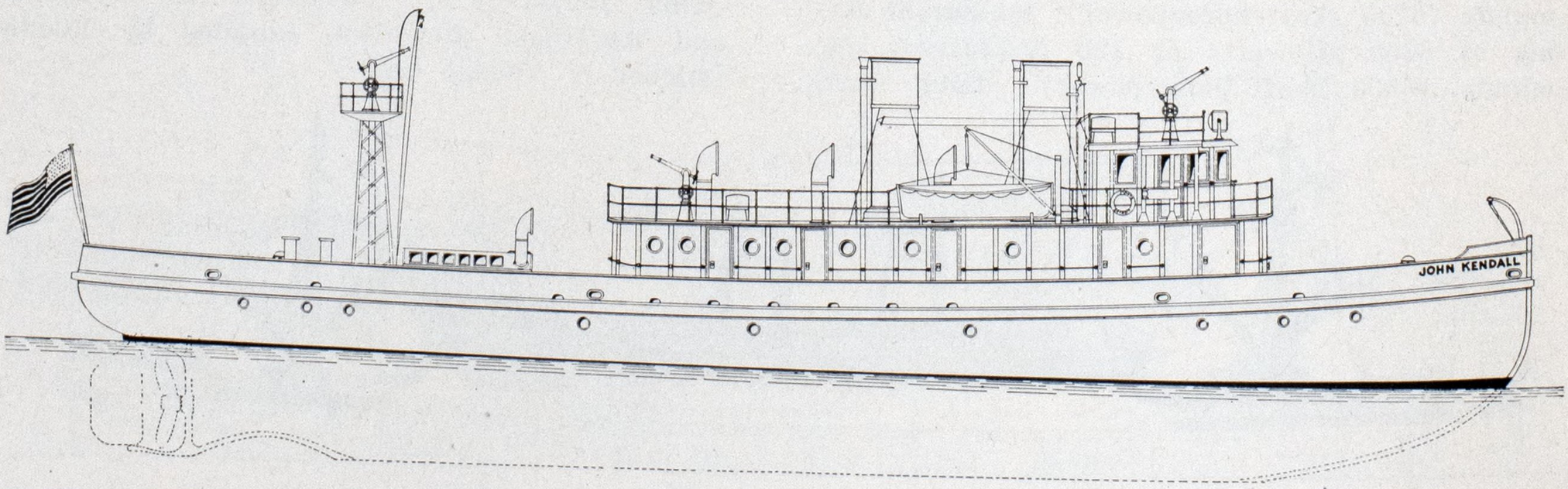
Auxiliaries—There are two 12-inch 4-stage Manistee Roturbo centrifugal pumps, each direct connected to an 800-horsepower General Electric 5-stage steam turbine; also two 6-inch 4-stage Manistee Roturbo centrifugal pumps, each direct connected to a General Electric turbine of the 2-stage type. All auxiliaries, such as bilge pumps, oil transfer, sanitary and circulating pumps, capstans, steering gear and fan, are steam operated. For lighting there is one 10-kilowatt General Electric turbine generating set and for emergency purposes a Pyle 1½-kilowatt generating set.

DESCRIPTION

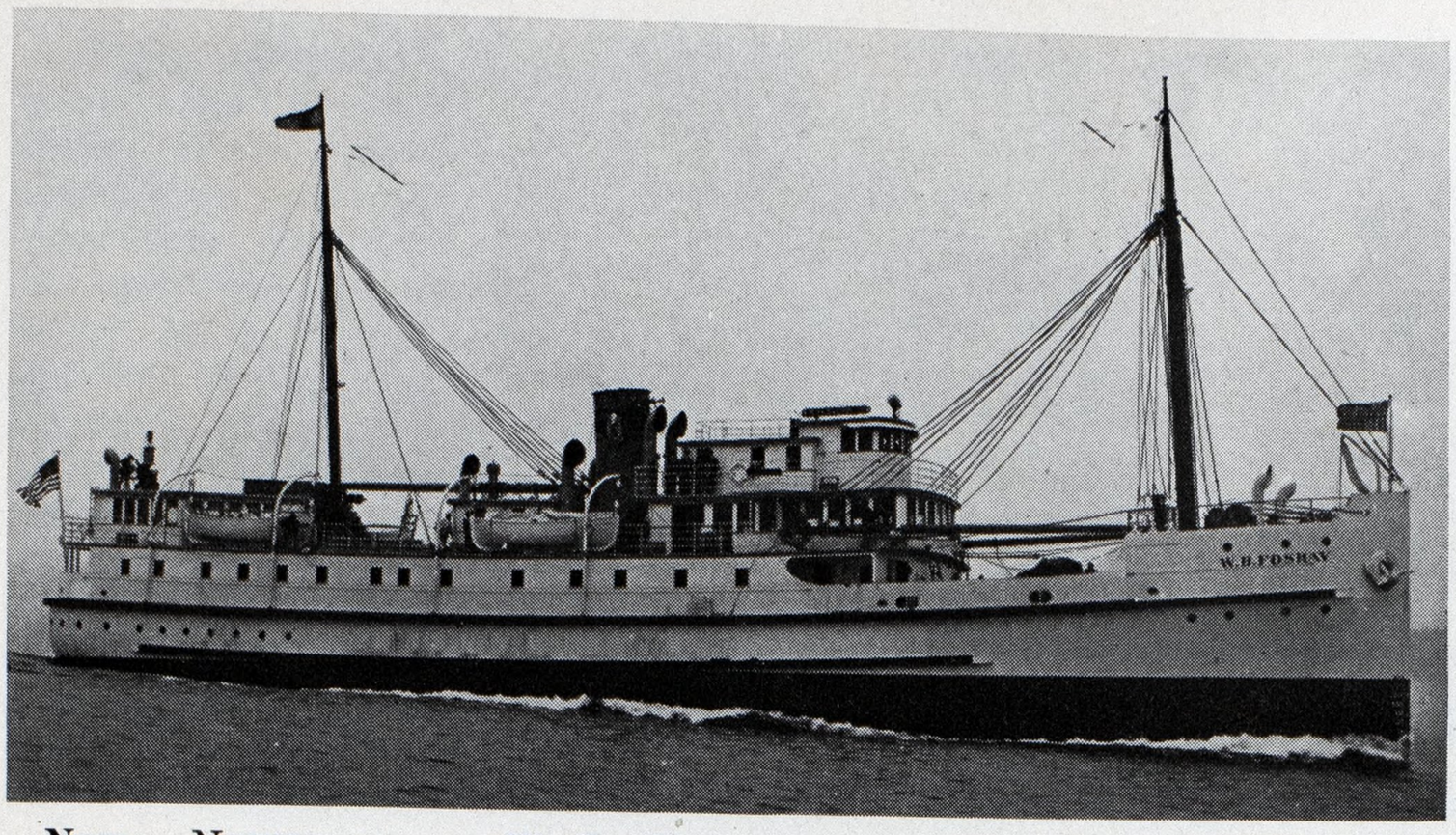
The JOHN KENDALL, as it is one of the latest, is also one of the most powerful and modern fireboats in the United States. The hull and upper works are of substantial steel construction throughout. The speed is 16 miles per hour. Eleven thousand gallons of water per minute can be delivered at 200 pounds pump pressure.

AUXILIARY EQUIPMENT

Fire Pumps—Manistee Iron Works Co.
Pumps—Union Steam Pump Co.
Windlass—Hyde Windlass Co.
Winches—Hyde Windlass Co.
Steering Engine—Hyde Windlass Co.
Propellers—Toledo Shipbuilding Co. Inc.
Oil Burning Equipment—Schutte & Koerting
Blower—American Blower Co.; General Electric steam turbine drive
Condenser—Wheeler
Valves and Fittings—Crane Co.
Marine Hardware—The Dayton Mfg. Co.
Soot Blowers—Diamond Power Specialty Corp.
Searchlights—Sperry Gyroscope Co.



NORTHLAND—Passenger Coastwise—Twin Screw—Diesel



Name—NORTHLAND, ex W. B. FOSHAY
Owner—Northland Transportation Co.
Builder—Lake Washington Shipyards
Naval Architect—Lee & Brinton Inc.
Launched—July 27, '29; completed, Oct. 1, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 186 feet; beam, 35 feet; depth molded, 21 feet 6 inches; draft, loaded, 15 feet 6 inches; displacement loaded, 1760 tons; gross tonnage, 1255; number of propellers, 2; passenger capacity, 56 first class; none in other classes; freight capacity, cubic feet, 37,000; bunker diesel fuel capacity, 17,500 gallons giving a cruising radius of 2400 miles; speed, loaded, 11 knots.

MACHINERY PARTICULARS

Main Engines—Two, 8-cylinder 4-cycle, single acting, solid injection diesel engines, each of 560 brake horsepower; known as the Washington-Estep diesel, built by Washington Iron Works. Size, diameter of cylinders 14½ inches; stroke, 18 inches; revolutions per minute, 250.

Auxiliary Generating Sets—Two, 50-kilowatt, 110-volt Westinghouse Electric & Mfg. Co. direct current generators, each driven by one 4-cylinder, 75 brake horsepower Washington-Estep diesel engine. One 5-kilowatt Kohler set for emergency purposes.

DESCRIPTION

This vessel was originally named W. B. FOSHAY and is the largest and finest vessel designed primarily for the transportation of frozen fish from Seattle to Ketchikan, Alaska. Passenger accommodations are provided for 56 persons, all outside rooms located on the upper deck. There are two complete decks.

AUXILIARY EQUIPMENT

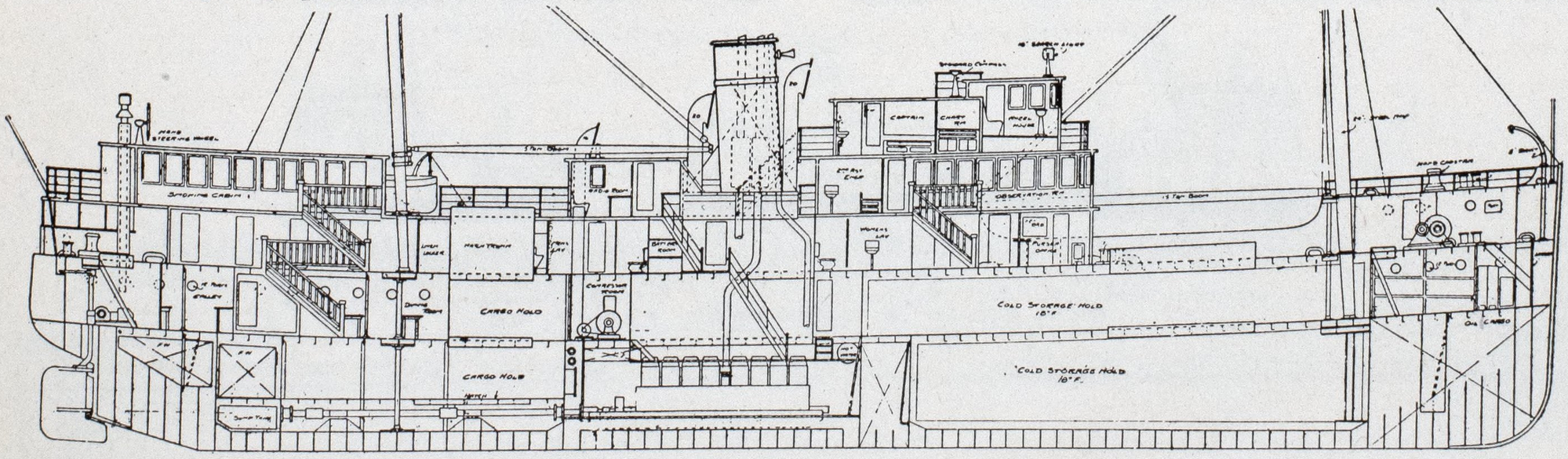
Manufacturers of:

Pumps—De Laval, centrifugal
Refrigeration—Two 12-ton Frick
Galley—Buell Range, Ray Oil Burner
Radio Equipment—Radio Corp.
Windlass—Allan Cunningham
Steering Engine—Allan Cunningham
Winches—Allan Cunningham
Capstan—Electric, Allan Cunningham
Oil Purifiers—Two, De Laval
Engine Room Telegraph—Chas. Cory & Son
Electric Motors—General Electric Co.

The NORTHLAND is a single bottom vessel built to the American Bureau of Shipping's highest class for her service. In the fore peak she carries 60 tons of oil for the Alaska trade. The main lower hold can carry 12,200 cubic feet of refrigerated cargo to as low a temperature as 18 degrees. All her holds with the exception of the upper after hold are insulated with eight inches of Armstrong cork.

Cargo handling gear has been carefully worked out and has been designed to take care of a maximum lift of 15 tons. Winches are of 25 horsepower drum type.

Accommodations for passengers are on the main deck. The purser's office and quarters are in the forward end of the deck house. Directly aft is the lobby with staircase leading to the observation cabin. Staterooms are outboard.



CORONADO—Ferry—Double Ended—Diesel Electric



Name—CORONADO
Owner—San Diego & Coronado Ferry Co.
Builder—The Moore Dry Dock Co.
Naval Architect—W. J. Pollock
Launched—Mar. 7, '29; completed April 15, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 190 feet 1 inch; length between perpendiculars, 178 feet; breadth molded, 43 feet 6 inches; depth molded, 14 feet 9 inches; breadth extreme, 60 feet 1 inch; draft light, 10 feet 2¾ inches; displacement light, 660 tons; gross tonnage, 503; net tonnage, 340; passenger capacity, 200; automobile capacity, 52; bunker fuel capacity in tons, 23; speed, 12 knots.

MACHINERY PARTICULARS

Maine Engines—Two, eight-cylinder, four-cycle mechanical injection diesel engines built by the Atlas Imperial Diesel Engine Co. Cylinder diameter, 13 inches; stroke 16 inches. Each engine develops 500 horsepower at 277 revolutions per minute, and is direct connected to an electric generator.

Main Generators—Two, each of 310 kilowatts, 250 volts, shunt wound, direct current with a 25 kilowatt d.c. exciter attached; built by Westinghouse Electric & Mfg. Co.; each generator driven by one of the main diesel engines

DESCRIPTION

A two deck, single screw, double ended ferry boat for automobiles and passengers between San Diego and Coronado, Calif. A distance of 2900 feet between slips. Special consideration was given to the design of lines, propellers and the control of various engine speeds to give maximum acceleration and deceleration for a four minute running time.

Main Propulsion Motors—Two, each of 750 shaft horsepower at 180 revolutions per minute, 500 volts direct current; shunt wound and separately excited at 125 volts; built by Westinghouse Electric & Mfg. Co. Each propulsion motor is connected to a propeller at each end

Auxiliary Generator—One, 12½ volts direct current of Westinghouse manufacture, direct connected to a Continental gasoline engine.

AUXILIARY EQUIPMENT

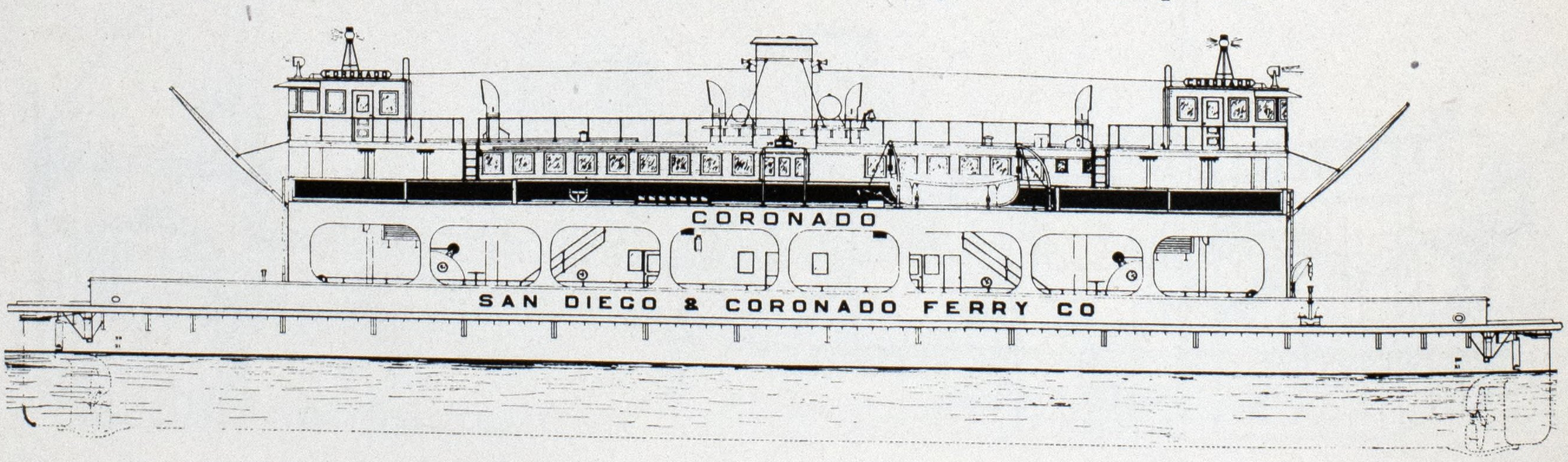
Manufacturers of:

Pumps—Byron Jackson; Viking; Worthington
Capstans—American Engineering Co.
Steering Gear—Electric; Allan Cunningham
Propellers—The Moore Dry Dock Co.
Oil Purifier—Sharples No. 44
Air Compressor—Auxiliary; Rix, Class G
Pilot House Control—Westinghouse
Lighting—Westinghouse Electric & Mfg. Co.
Electric Motors for Pumps—Westinghouse
Stern Bearings—B. F. Goodrich Rubber Co.

REMARKS

The hull of the CORONADO up to the automobile deck is of steel on the transverse system of framing and there are six steel watertight bulkheads. The automobile deck is a caulked wood deck sheathed with cedar.

Top sides are of the open panel type, a feature desirable when housing automobiles in an all year mild temperature.



CITY OF SAGINAW 31—Carferry—Lakes—Twin Screw—Electric



Name—CITY OF SAGINAW 31
Owner—Pere Marquette Railway
Builder—Manitowoc Shipbuilding Corp.
Naval Architect—Manitowoc Shipbuild'g. Corp.
Launched—Aug. 6, '29; completed, Nov. 22, '29
Classification—None; to Amer. Bureau rules
Sister Ship—CITY OF FLINT 32, launched Nov. 27, 1929; completed March 27, 1930

HULL PARTICULARS

Length over all, 381 feet 6 inches; length on keel, 368 feet; breadth molded, 57 feet; depth to car deck, 22 feet 6 inches; depth to spar deck, 40 feet 9 inches; gross tonnage, 3327; draft, 16 feet forward, 18 feet aft; passenger capacity, 43; cargo capacity, thirty 80-ton 42-foot railroad cars; speed, over 18 statute miles per hour.

MACHINERY PARTICULARS

Main Engines—Two, impulse type, 14-stage turbine generating sets. Each set is rated at 2880 kilowatts, 2300 volts at 3600 revolutions per minute; three phase, 60-cycle a.c.

Propulsion Motors—Each generator delivers current to a 3600 shaft horsepower, single armature propelling motor, operating at 118 revolutions per minute. Each motor is direct connected to a propeller of about 14 feet diameter and 16 feet pitch.

Boilers—Four, Babcock & Wilcox water tube marine boilers with a total heating surface of 20,760 square feet, and total superheating surface of 1868 square feet; equipped with Babcock & Wilcox chain grate stokers; fuel, coal; working pressure, 350 pounds per square inch; total temperature, 625 degrees Fahr., 200 degrees superheat; total grate surface, 480 square feet.

Auxiliary Generator—A dual drive set consisting of a turbine driving an alternating current generator and a direct current generator of 575 horsepower, through reduction gearing

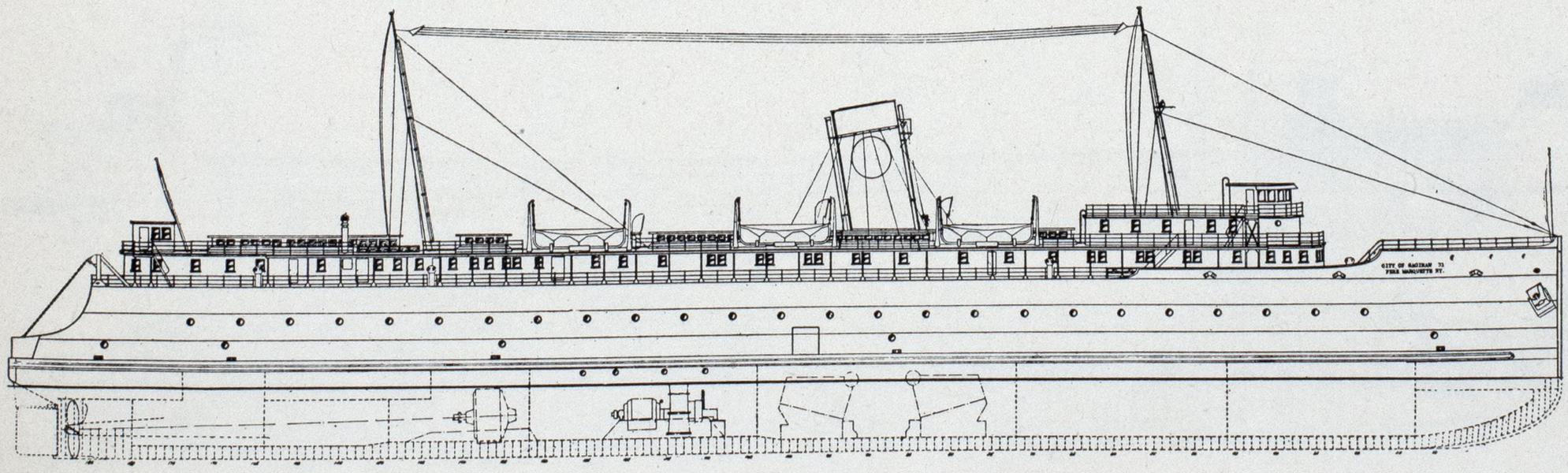
DESCRIPTION

Probably the most advanced vessel of her class in the world. The hull of substantial steel construction is similar to customary practice on the Great Lakes, but in order to make a high speed of over 18 miles per hour, much greater power is used. To get this power economically electric drive was decided on.

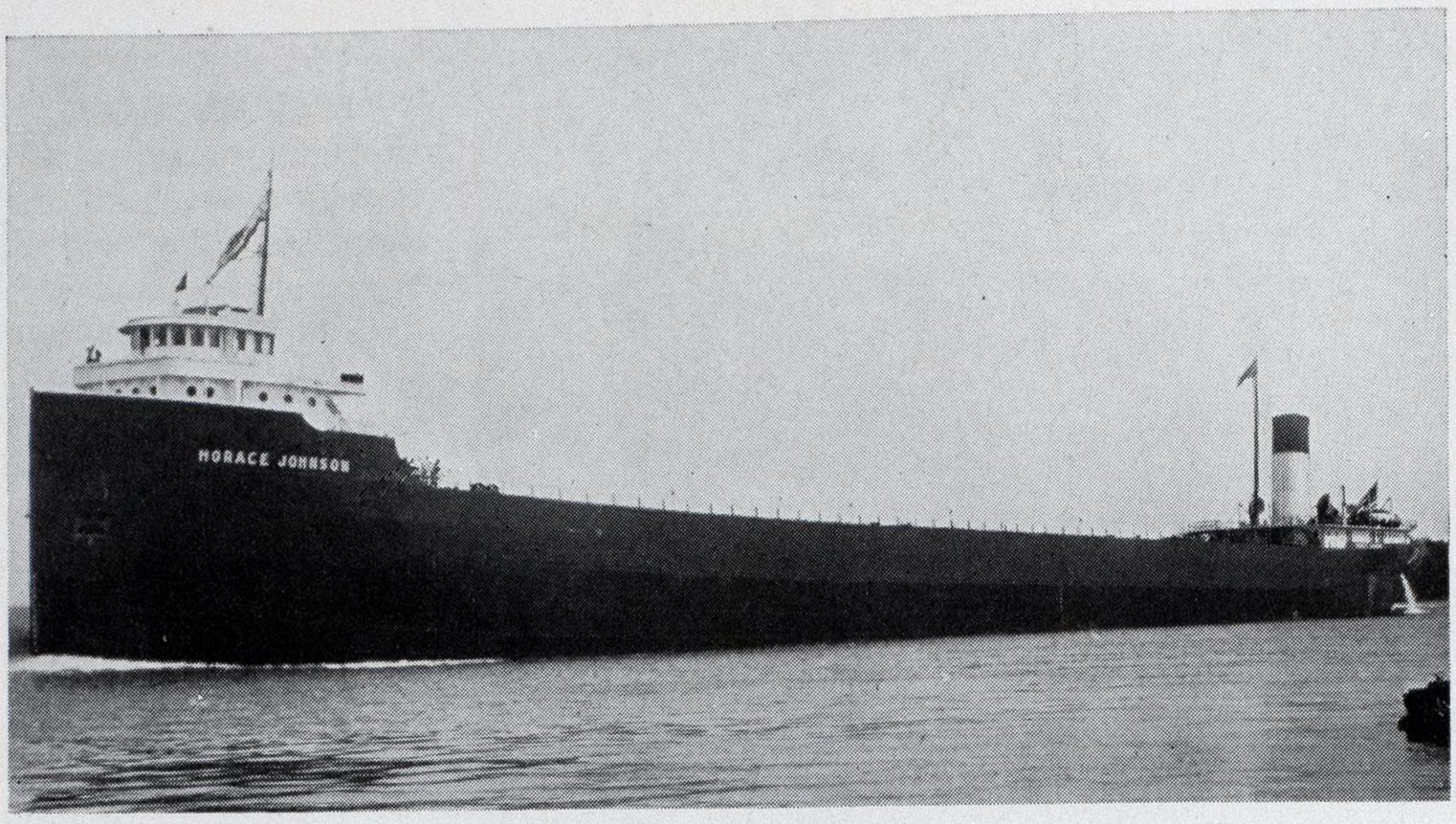
AUXILIARY EQUIPMENT

Pumps—Dean-Hill Pump Co.; Dean
Steering Gear—Benson Electric Co.
Refrigeration—Frigidaire Corp.
Radio Compass—Federal Radio
Telegraphs—Kirk, Habicht Co.
Magnetic Compasses—Two, Kelvin-White
Heaters—Griscom-Russell Co.
Oil Purifiers—De Laval
Fans—American Blower Co.
Mooring Winch; Gypsies—Benson Electric Co.
Soot Blowers—Diamond Power Specialty Corp.
Pump Engine—Engberg vertical, steam.
Deck Covering—Selby Battersby & Co.
Windows—Kearfott Engineering Co.

Wide use has been made of plywood for interior paneling and plymetal for doors supplied by the Haskelite Mfg. Corp.



HORACE JOHNSON—Freighter—Great Lakes—Single Screw—Steam



Name—HORACE JOHNSON
Owner—Pittsburgh Steamship Co.
Builder—American Ship Building Co.
Naval Architect—A. W. Cross, Am. S.B. Co.
Launched—July 20, '29; completed, Sept. 5, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 604 feet; length between perpendiculars, 580 feet; breadth molded, 60 feet; depth molded, 32 feet; draft, 21 feet; displacement loaded, 19,830 tons of 2000 pounds each; gross tonnage, 7897.98; net tonnage, 6146.51; cargo capacity, 14,600 tons of 2000 pounds each; cargo capacity in cubic feet, 640,750; bunker fuel capacity in short tons, 475; speed in service, 12 miles.

MACHINERY PARTICULARS

Main Engine—One, triple expansion reciprocating steam engine, built by the American Ship Building Co. Size, 24½ x 41 x 65 inches x 42-inch stroke; indicated horsepower, 2200 at 85 revolutions per minute.

Boilers—Three, scotch type, single ended, built by the American Ship Building Co. Size, 14 feet in diameter and 12 feet long; two furnaces for each boiler; 2911 square feet of heating surface for each boiler and 190 pounds per square inch working pressure; fuel, coal hand fired on grates.

Auxiliary Generators—Three, General Electric reciprocating engine driven 15 kilowatts each.

AUXILIARY EQUIPMENT

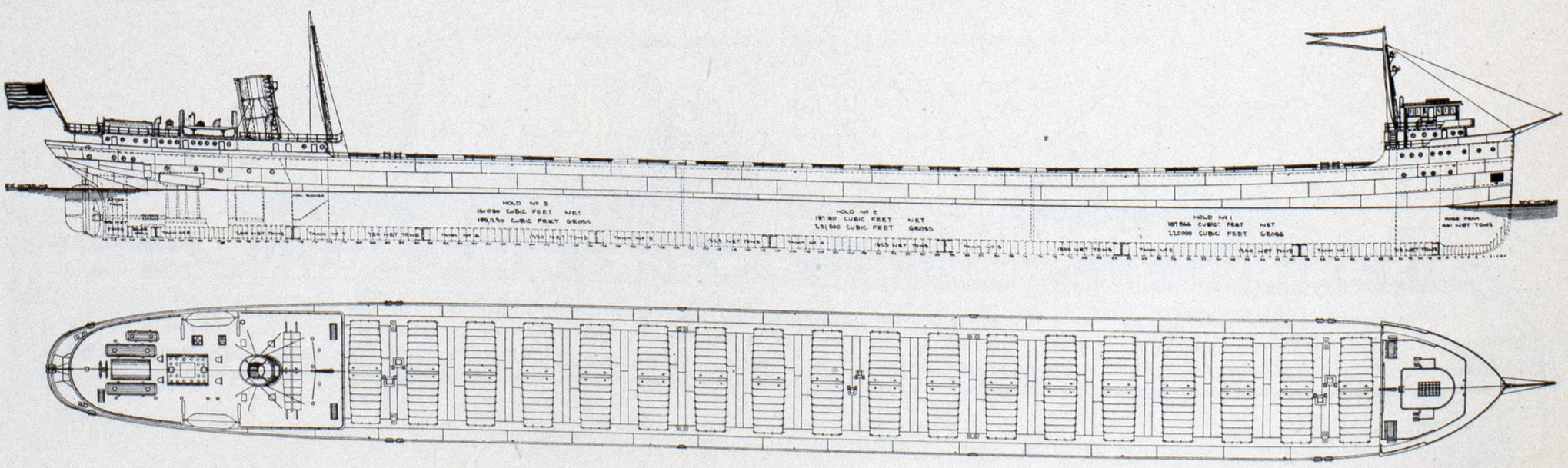
Manufacturers of:

Pumps—Warren Steam Pump Co., Inc.
Windlass—American Ship Building Co.
Winches—American Ship Building Co.
Steering Gear—American Ship Bldg Co.
Propellers—American Ship Building Co.
Refrigeration—Phoenix, two-ton motor drive
Aux. Condenser & Pump—Worthington
Valves and Fittings—Crane Co.
Marine Hardware—The Dayton Mfg. Co.
Contra Rudders—Th. Goldschmidt Corp.
Anchor Chain—National Malleable Co.
Gyro Compass—Sperry Gyroscope Co.

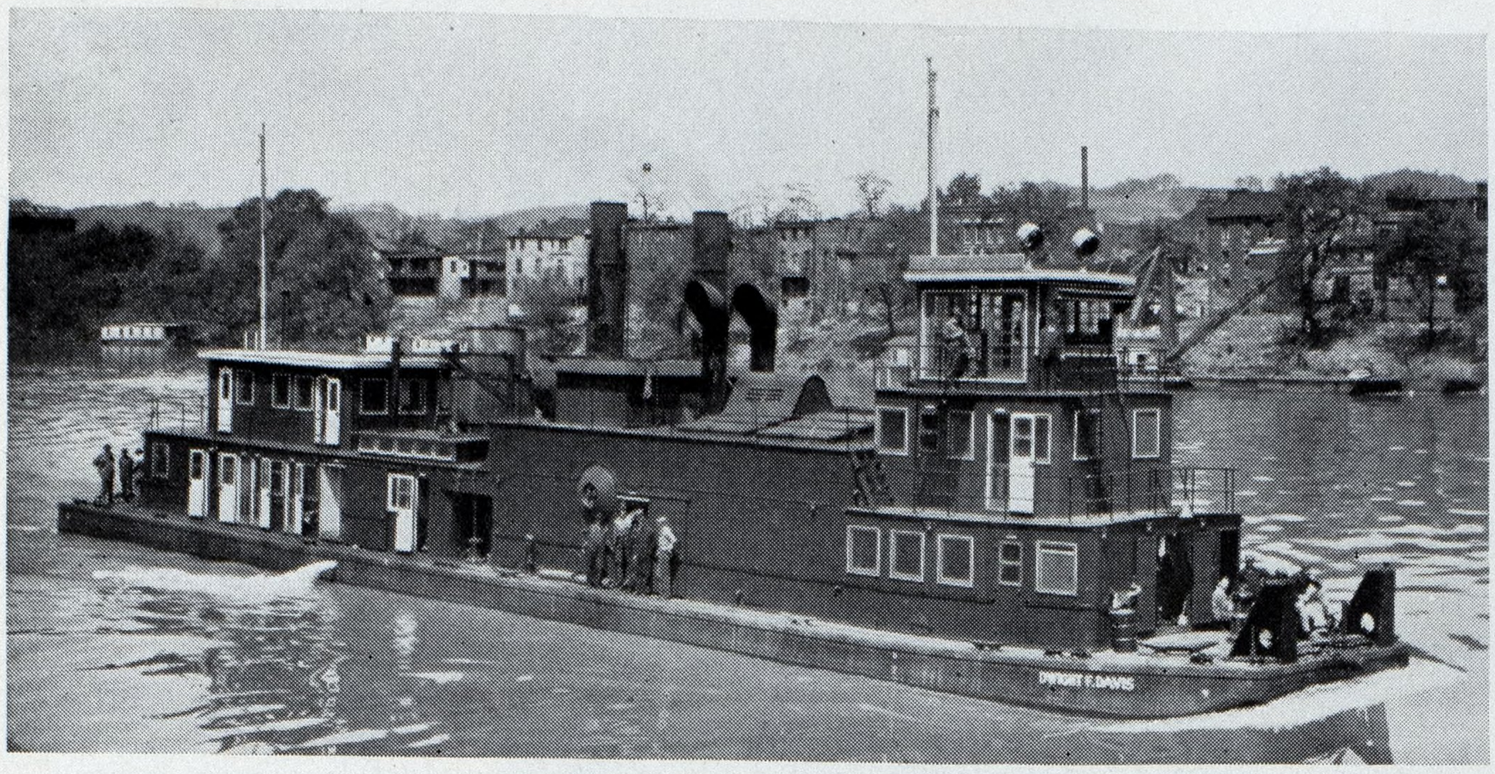
The HORACE JOHNSON is typical of the practically standardized modern, large, American freighter for Great Lakes service. The vessel is built with the usual built-up plate and section arches spaced 24 feet apart with 12 feet of deck between hatches. The side hoppers slope from the main deck stringer to the tank top so that the hold and sides represent a smooth and unobstructed space for cargo facilitating getting the last bit of cargo completely and easily out of the vessel. The hull has quintuple riveted overlapped butts on the sheer strake and deck stringers.

DESCRIPTION

A standard, modern, large bulk freighter for the Great Lakes. The bottom and deck of this vessel are built on the longitudinal framing system while transverse framing is used for the sides of the ship. Cargo space is divided into three large compartments by two bulkheads of the staggered type. There are six hatches to each compartment.



DWIGHT F. DAVIS—River Towboat—Twin Screw—Steam



Name—DWIGHT F. DAVIS
Owner—Inland Waterways Corp.
Builder—Charles Ward Engineering Works
Naval Architect—A. R. Wurtele
Launched—Feb. 9,' 29; completed, April 25, '29.
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 140 feet; breadth molded, 25 feet; depth molded, 9 feet; draft, 7 feet; displacement loaded, 554 tons; gross tonnage, 400; net tonnage, 156; bunker fuel capacity in coal, 150 tons.

MACHINERY PARTICULARS

Main Engines—Two, triple expansion reciprocating steam engines built by Nordberg Mfg. Co. Size, 10½ x 16½ x 27 inches x 18 inches stroke; total indicated horsepower two engines, 1000.

Boilers—Two, Babcock & Wilcox water tube marine boilers with a total heating surface of 4032 square feet, equipped with Babcock & Wilcox air heaters; working pressure, 295 pounds per square inch; fuel, pulverized coal and oil.

Pulverized Coal—The outstanding feature of this towboat is the use of pulverized coal for the first time in a new boat for river service. This combined with the latest modern reciprocating steam engines and water tube boilers makes the power installation of unusual interest and the successful operation of this vessel is likely to bring forth important changes in river craft design. The pulverized coal equipment was designed and built by the Fuller-Lehigh Co. and consists of type A table mills and circular turbulent pulverized coal burners.

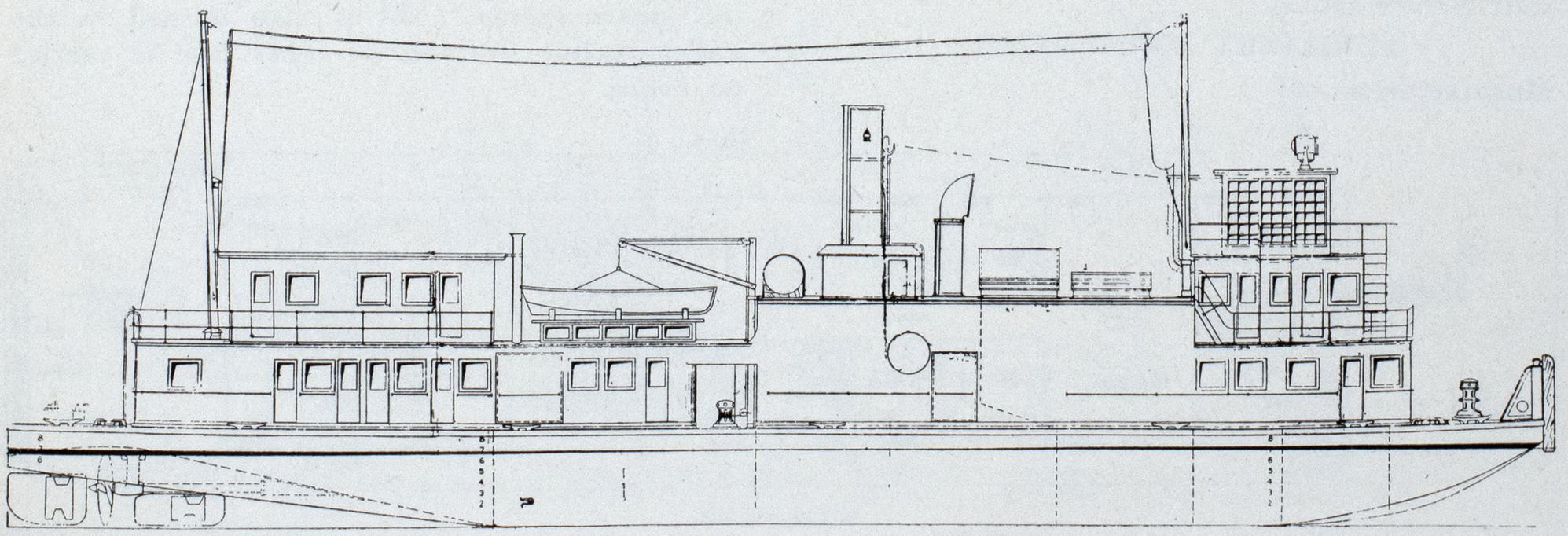
DESCRIPTION

This vessel is said to be the first river towboat to be built new with pulverized coal equipment for providing the power. In adopting pulverized coal fuel a wise departure from usual practice is made in the interests of the development of marine engineering. This boat is of all steel construction and is propelled by twin screws.

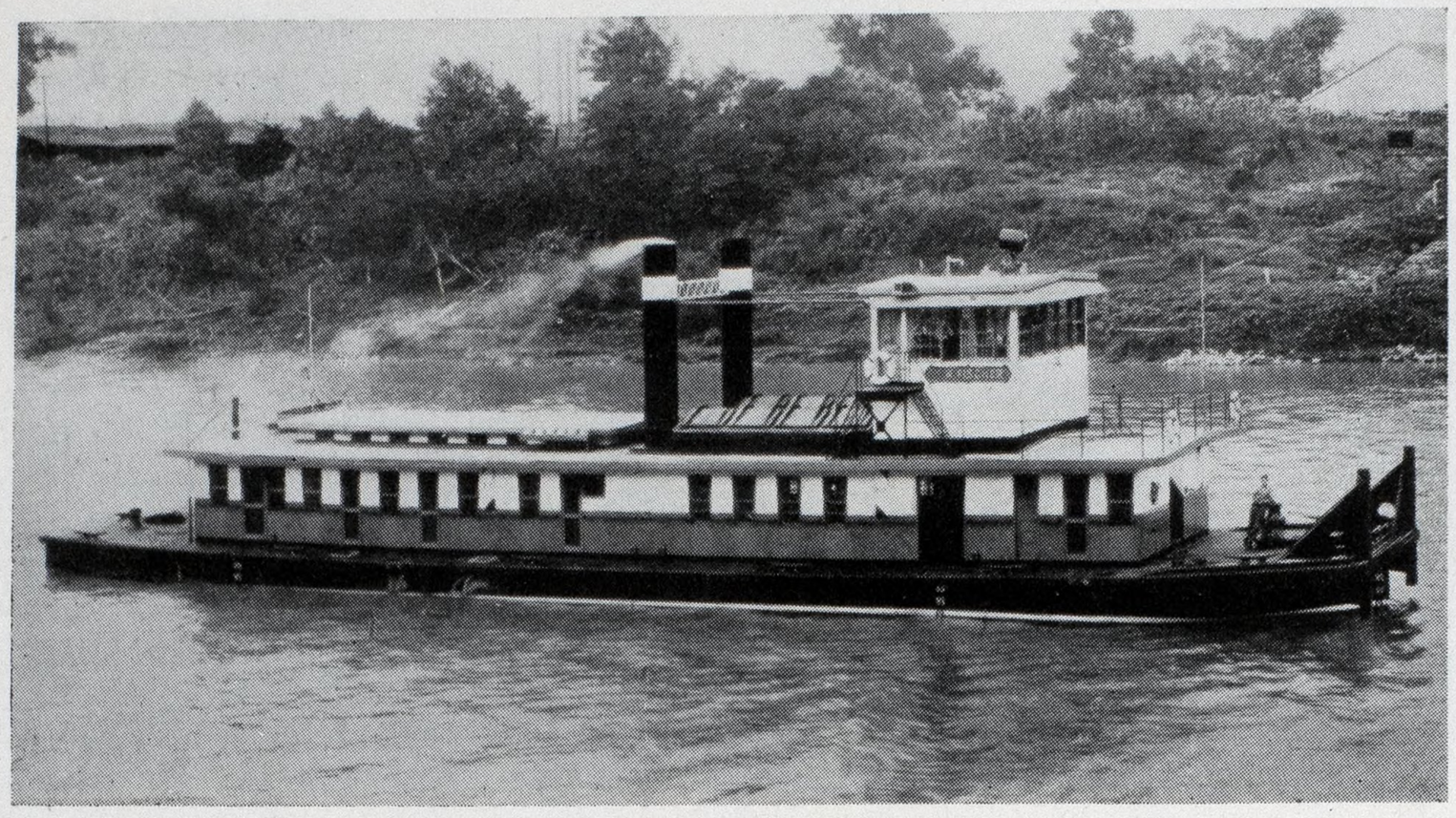
AUXILIARY EQUIPMENT

Manufacturers of:
Pumps—Worthington
Windlass—Hyde Windlass Co.
Winches—Marine Mfg. & Supply Co.
Steering Engine—Marietta Mfg. Co.
Propellers—Sheriffs Mfg. Co.
Refrigeration—Kelvinator Corp.
Electric Generators—Westinghouse
Soot Blowers—Diamond Power Specialty
Searchlights—Sperry Gyroscope Co.
Induced Draft Fans—B. F. Sturtevant Co.

The towboat DWIGHT F. DAVIS was built for the Inland Waterways Corp. which for years has been developing river transportation under government ownership and direction. The new towboat cost approximately $200,000. Gen. T. Q. Ashburn, the directing head of the corporation has been progressive in his search for greater economy in river boat operation.



W. W. FISCHER—River Towboat—Twin Screw—Diesel



DESCRIPTION

A twin screw diesel drive river towboat, said to be the largest of its type so far constructed in the South. This towboat is being used on the Mississippi river towing barges of sand and gravel. The hull is tunneled in way of the propellers and the bow has been given a ship's form though the deck is sponsoned out for towing purposes.

Name—W. W. FISCHER
Owner—Central Sand & Gravel Co.
Builder—Nashville Bridge Co.
Naval Architect—Harry B. Dyer
Launched—June 22, '29; completed, Aug. 15, '29.
Classification—River towing

HULL PARTICULARS

Length over all, 121 feet 3 inches; length between perpendiculars, 120 feet; breadth molded 26 feet; depth molded 8 feet; draft, 5 feet 6 inches; bunker fuel capacity in tons, 80; speed, 12 miles per hour.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder 2-cycle solid injection Fairbanks-Morse marine diesel engines; size, diameter of cylinders 14 inches, stroke, 17 inches; brake horsepower of each engine, 360 at 250 revolutions per minute.

The engines are direct connected to the propeller shafting which runs in S.K.F. self-aligning roller bearings throughout. The propellers operating in tunnels are 6 feet in diameter and are made of manganese bronze.

Auxiliary Generators—Two, one of these is of 20 kilowatts capacity driven by a Fairbanks-Morse diesel engine and the other is a 5-kilowatt Kohler set.

AUXILIARY EQUIPMENT

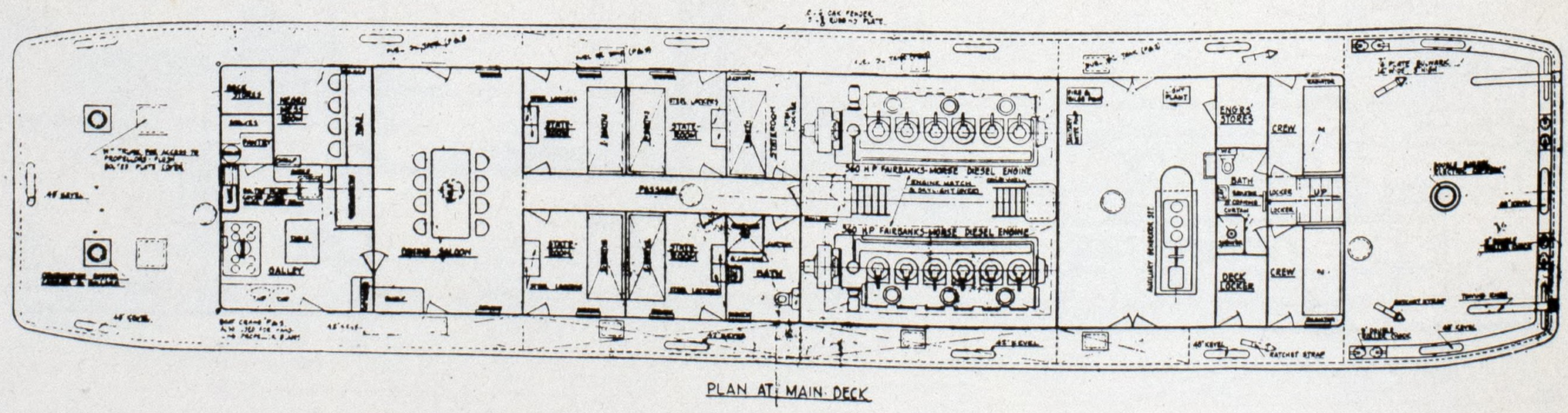
Manufacturers of:

Pumps—Fairbanks-Morse & Co.
Capstan—American Engineering Co.
Steering Gear—Nashville Bridge Co.
Propellers—Columbian Bronze Corp.
Refrigeration—Frigidaire Corp.
Marine Hardware—Dayton Mfg. Co.

The auxiliary power plant supplies electric current for all of the electrically driven units. A 50-cubic foot capacity air compressor is clutch connected to the 25-horsepower Fairbanks-Morse diesel engine which drives the generator. In addition to the 5-kilowatt lighting set there is a 1½-kilowatt gasoline-kerosene unit for emergency lighting or when the auxiliary power plant does not operate.

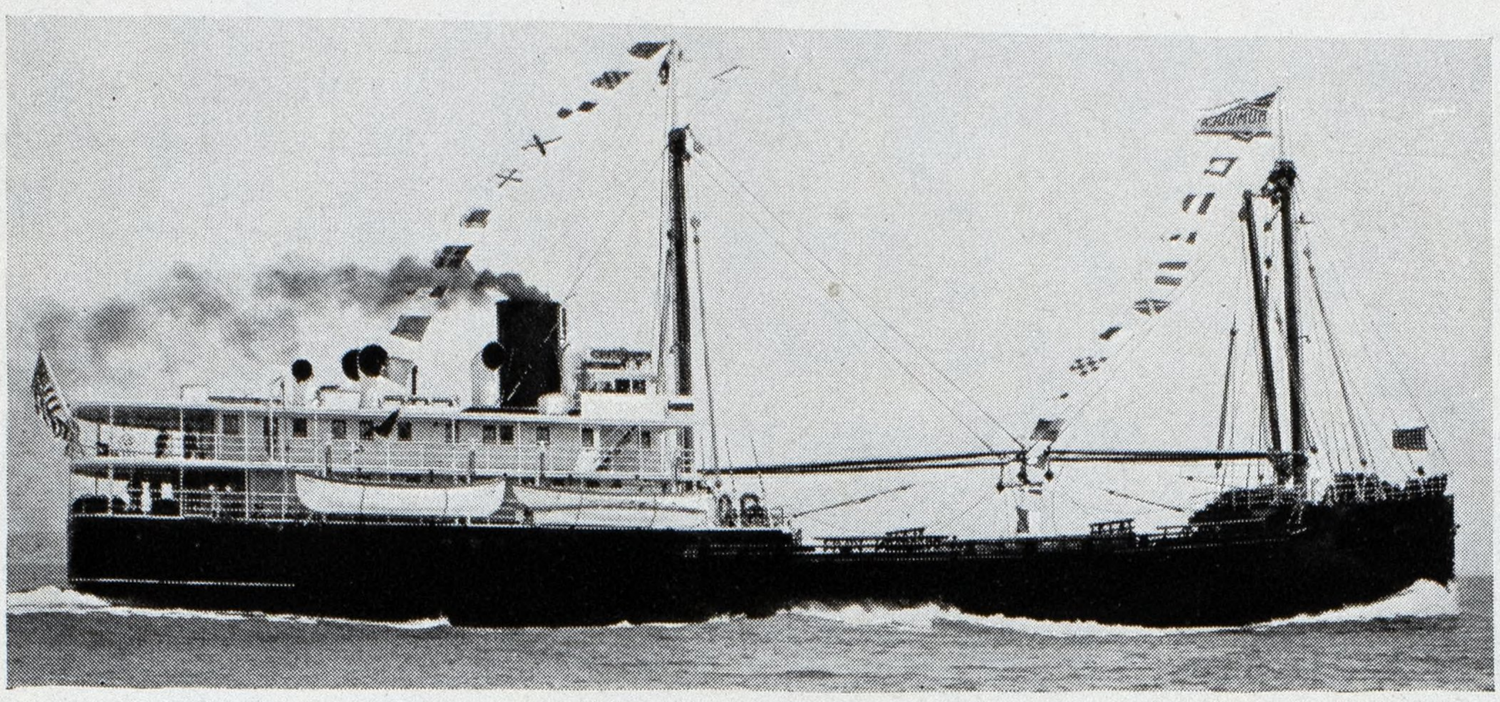
A fire and bilge pump of 150 gallons per minute at 100 pounds per square inch pressure is electrically driven; so also is the capstan which is of sufficient power to break a 2-inch manila line. Water for sanitary purposes obtained from the river is forced through a filtration and purifying system by an automatic electrically driven pump.

The boat is steered by means of a special air motor arrangement controlled from a small lever in the pilot house. Provision is also made for hand steering. There is an oil burning steam system. Oil is also burned in the galley range. No coal or other fuel is carried on board.



PLAN AT MAIN DECK

HUMUULA—Passenger—Inter-Island—Single Screw—Steam



Name—HUMUULA
Owner—Inter-Island Steam Navigation Co.
Builder—Bethlehem S. B. Corp., Union Plant
Naval Architect—E. P. McRitchie
Launched—June 15, '29; completed, Aug. 10, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 218 feet 3 inches; length between perpendiculars. 210 feet 9 inches; breadth molded, 38 feet; depth molded, 17 feet; draft, 12 feet 8 inches; displacement loaded, 1937 tons; gross tonnage, 961; net tonnage, 519; passenger capacity, first class, 36, second class, none, third class, 32; cargo capacity in cubic feet, 41,265; bunker fuel oil capacity in tons, 283; speed, 13.4 knots.

MACHINERY PARTICULARS

Main Engine—One complete expansion, combined impulse reaction type, turbine developing 1850 shaft horsepower at 3600 revolutions per minute of the turbine and 125 revolutions of the propeller shaft. The turbine is connected to the propeller shaft through a single pinion double reduction gear giving a propeller speed of 125 revolutions per minute. Both turbine and reduction gears were built by the Westinghouse Electric & Mfg. Co.

DESCRIPTION

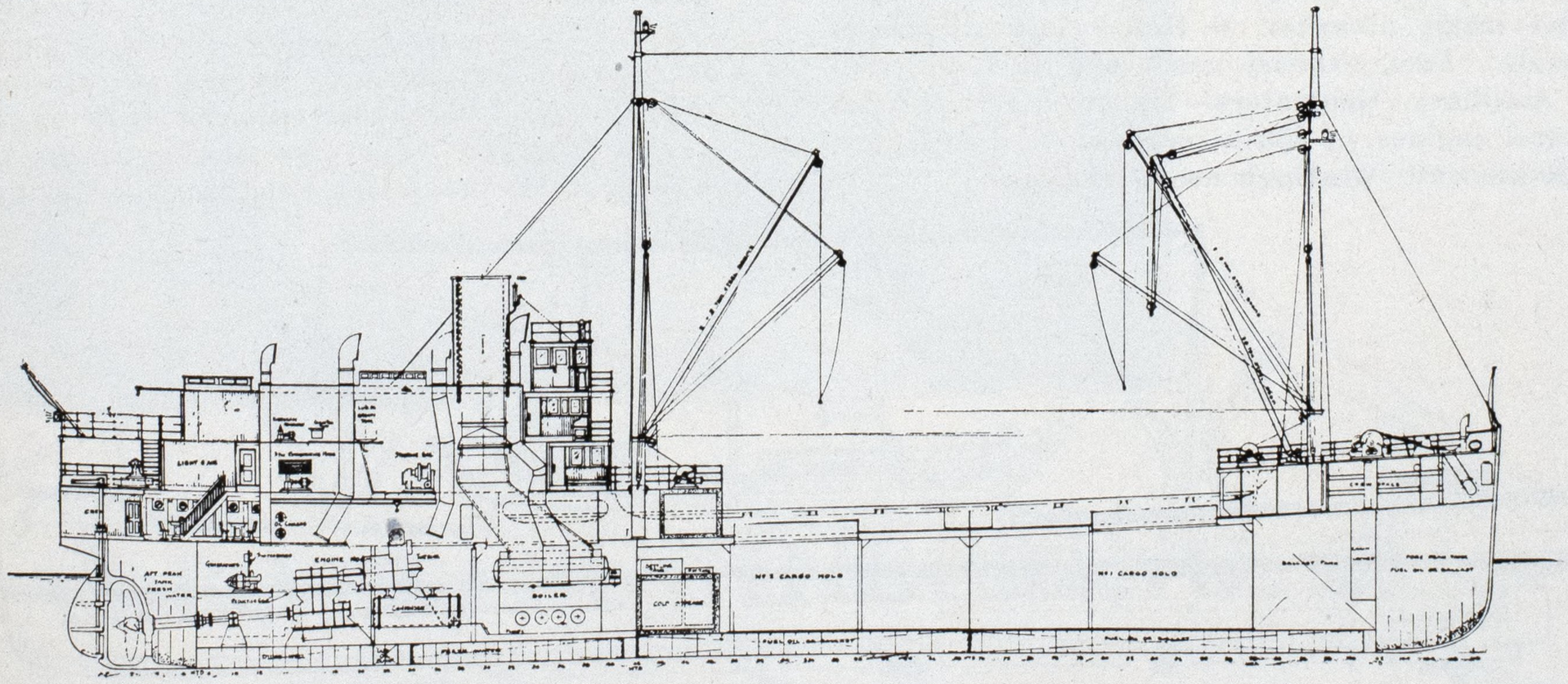
This vessel completed last summer is used in Hawaiian island trade for carrying passengers and cargo. Her propelling machinery is practically identical to one of the two units used on the HUALALAI. The speed of this vessel is 13½ knots and she is economical to operate.

Boilers—Two, Babcock & Wilcox water tube marine boilers with a total heating surface of 5526 square feet and a total superheating surface of 470 square feet; working pressure, 280 pounds per square inch; fuel, oil. Superheaters and oil burning equipment furnished by the Babcock & Wilcox Co.

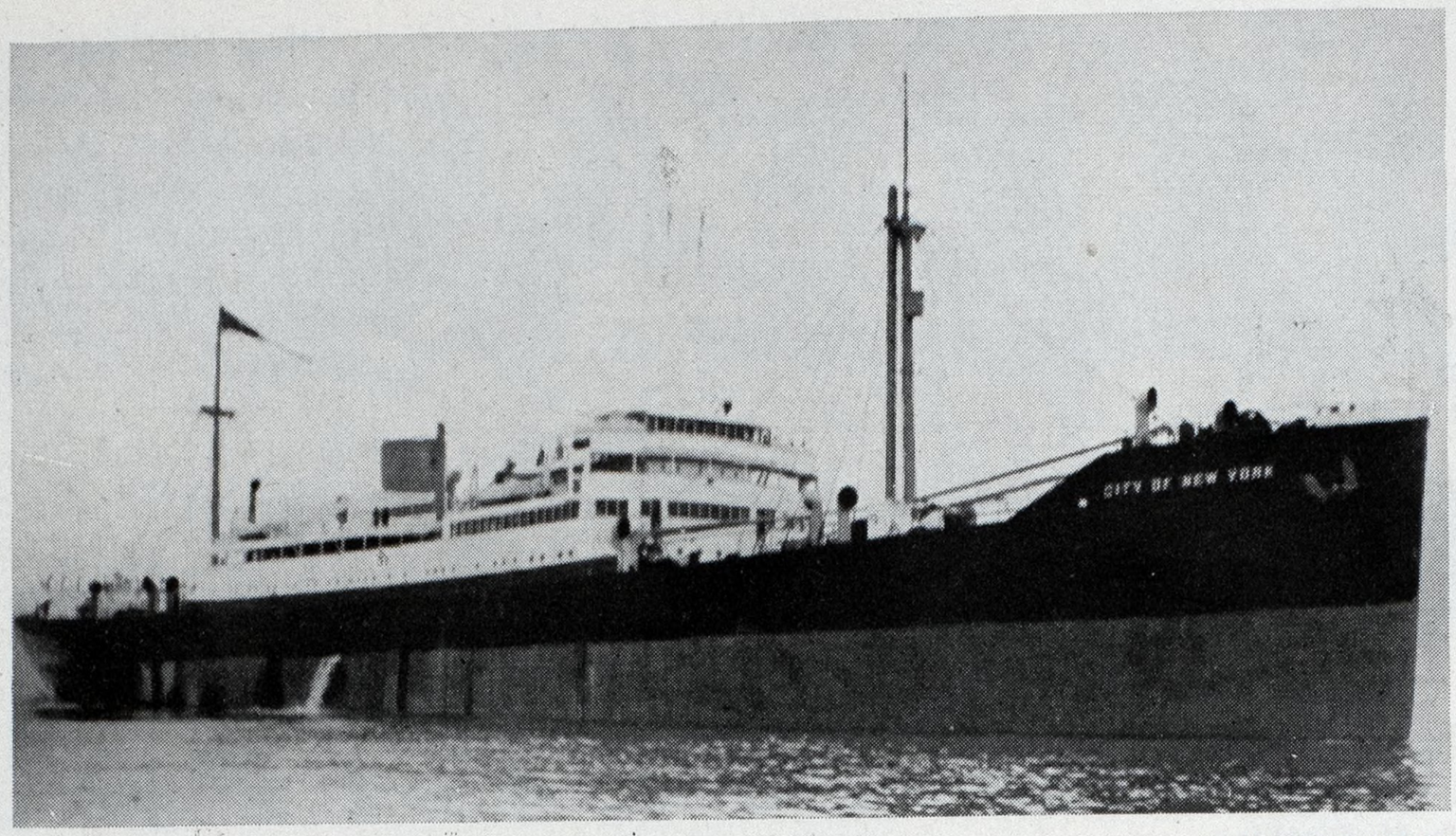
AUXILIARY EQUIPMENT

Manufacturers of:
Pumps—Warren Steam Pump Co.
Windlass—Union Plant, Bethlehem S. B. Corp.
Winches—Allan Cunningham Co.
Steering Engine—Union Plant, Beth. S. B.
Refrigeration—York Mfg. Co.
Electric Generators—Westinghouse Electric
Soot Blowers—Diamond Power Specialty Corp.
Searchlights—Sperry Gyroscope Co.
Lifeboats—Welin Davit & Boat Corp.
Air Compressor—Westinghouse Air Brake Co.

The main turbine and underneath condenser are located in an engine room, aft and correspond to the machinery installed on one shaft of the HUALALAI, except that the gear ratio has been slightly increased to give slower revolutions per minute of the propeller and the condenser is placed longitudinally under the turbine instead of athwartship.



CITY OF NEW YORK—Ocean Cargo—Twin Screw—Diesel



Name—CITY OF NEW YORK
Owner—American South African Line
Builder—Sun Shipbuilding & Dry Dock Co.
Naval Architect—John W. Hudson
Launched—Oct. 19, '29; completed, Jan, 18, '30
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 470 feet 9 inches; length between perpendiculars, 450 feet; breadth molded, 61 feet 6 inches; depth molded, 37 feet; draft, 26 feet; displacement loaded, 15,000 tons; gross tonnage, 8272.45; net tonnage, 5025; passenger capacity, first class, 56; cargo capacity in cubic feet, 449,055 bales; bunker fuel capacity in tons, 2200; speed, 14 knots.

MACHINERY PARTICULARS

Main Engines—Two 4-cylinder Sun-Doxford opposed piston oil engines built by the Sun Shipbuilding & Dry Dock Co. Each engine direct connected to a propeller. Size 23.62 inches bore and 79.12 inches combined stroke. Brake horsepower of each engine is 2700 at 100 revolutions per minute.

Boilers—Two single ended scotch type built by Sun Shipbuilding & Dry Dock Co. Size 7 feet inside diameter; 9 feet 9 inches between heads. Fuel, exhaust gases and fuel oil.

Auxiliary Generators—Three, Ingersoll-Rand diesel engines, of 335 horsepower each driving a 220-kilowatt Westinghouse generator.

DESCRIPTION

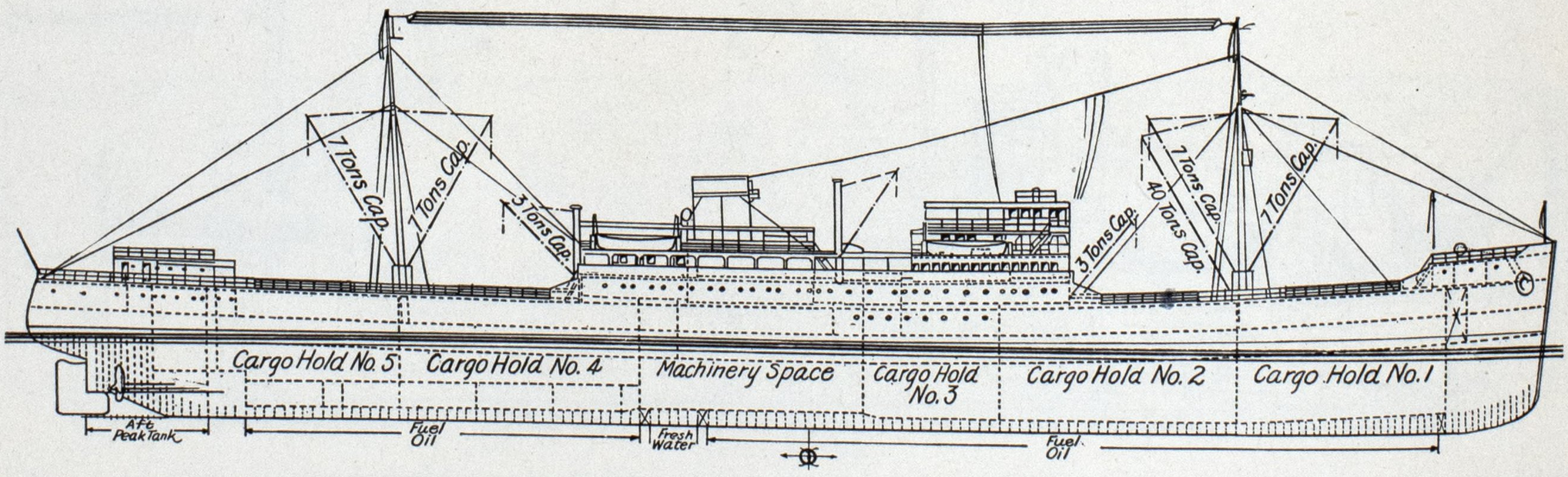
Twin screw diesel liner for cargo, passenger and mail service between New York and West Coast of Africa. A single deck ship with long bridge and top gallant forecastle. Five cargo holds, eight 7-ton booms, six 3-ton booms and one 40-ton boom. Comfortable passenger accommodations are provided for 56 passengers.

AUXILIARY EQUIPMENT

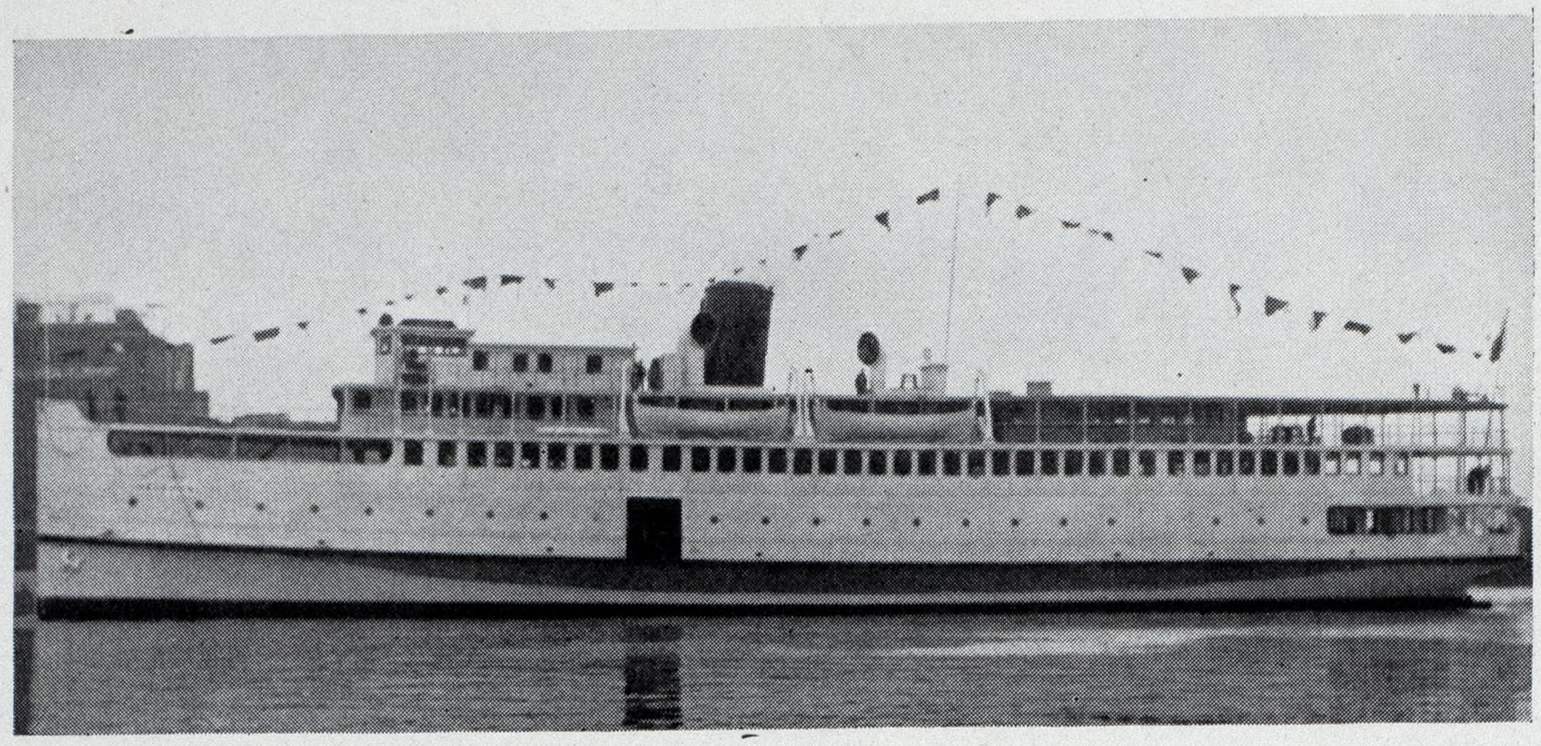
Manufacturers of:

Pumps—Worthington Pump & Mach. Corp.
Windlass—American Engineering Co.
Winches—American Engineering Co.
Steering Gear—American Engineering Co.
Propellers—Crown & Sun Shipbuilding
Refrigeration—Brunswick-Kroeschell Co.
Oil Burners—For two Boilers—Coen Co.
Lighting Fixtures—Cox, Nostrand & Gunnison
Depth Finder—Fathometer, Submarine Signal
Hardware—H. S. Getty & Co. Inc.
Thrust Bearings—Kingsbury Machine Works
Pressure Regulators—Leslie Co.
Force Feed Lubricators—Manzel Bros. Co.
Anchor Chain—National Malleable & S.C. Co.
Diesel Generator—Standard Motor Cons. Co.
Oil Purifiers—Sharples Specialty Co.
Gyro Compass—Sperry Gyroscope Co.
Gyro Pilot—Sperry Gyroscope Co.
Windows—Kearfott Engineering Co.
Searchlights—Sperry Gyroscope Co.
Life Saving Equip.—Welin Davit & Boat Corp.

The steaming radius of the CITY OF NEW YORK at 13 knots is 28,500 nautical miles. Cargo booms are served by 14 electric winches. Three of the five hatches are 36 feet by 18 feet. All passenger rooms are located outside on the three upper decks. See Feb. MARINE REVIEW.



NAUSHON—Passenger—Sound—Twin Screw—Steam



Name—NAUSHON
Owner—New England Steamship Co.
Builder—Fore River Plant, Beth. S. B. Corp.
Naval Architect—Bethlehem S. B. Corp.
Launched—May 7, '29; completed, May 20, '29
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 250 feet 9¾ inches; length between perpendiculars, 240 feet; breadth of hull molded, 45 feet; breadth over guards, 60 feet; depth molded, 16 feet; draft molded, 9 feet 8 inches; displacement loaded, 1435 tons; gross tonnage 1979; net tonnage, 936; passenger capacity, 2000 (day); cargo capacity, 200 tons; bunker fuel capacity, 56 tons of coal; speed, 14½ knots.

MACHINERY PARTICULARS

Main Engines—Two, 4-cylinder, triple-expansion built by Bethlehem Shipbuilding Corp. Size, 16 x 26 x 30 x 30 inches. 24 inches stroke; total indicated horsepower for both engines, 2000 at 170 revolutions per minute.

Boilers—Two, Babcock & Wilcox water tube marine boilers with a total heating surface of 6756 square feet; working boiler pressure, 200 pounds per square inch; fuel, coal hand fired.

AUXILIARY EQUIPMENT

Manufacturers of:

Pumps—Worthington (7) Beth. S. B. Corp. (1)
Windlass—Hyde Windlass Co.
Steering Engine—Hyde Windlass Co.
Propellers—Cramp's
Valves and Fittings—Crane Co.
Soot Blowers—Diamond Power Specialty Corp.
Marine Hardware—H. S. Getty & Co. Inc.
Stern Bearings—B. F. Goodrich Rubber Co.
Thrust Bearings—Bethlehem S. B. Corp.
Searchlights—Sperry Gyroscope Co. Inc.
Lifeboats—Welin Davit & Boat Corp.
Electric Generators—General Electric Co.

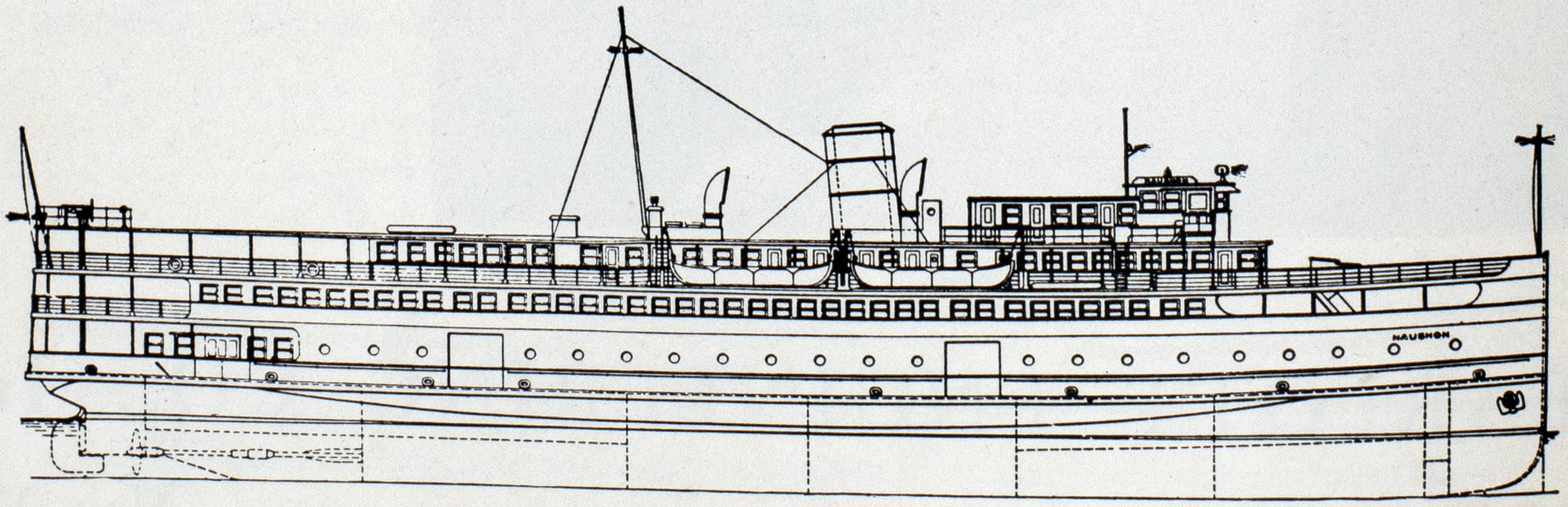
DESCRIPTION

This vessel is the fourth added since 1923 to the service between the mainland at New Bedford and Wood's Hole, Mass. to the islands of Martha's Vineyard and Nantucket. The three first vessels were practically duplicates but the NAUSHON is 50 feet longer than the others and has twin screws.

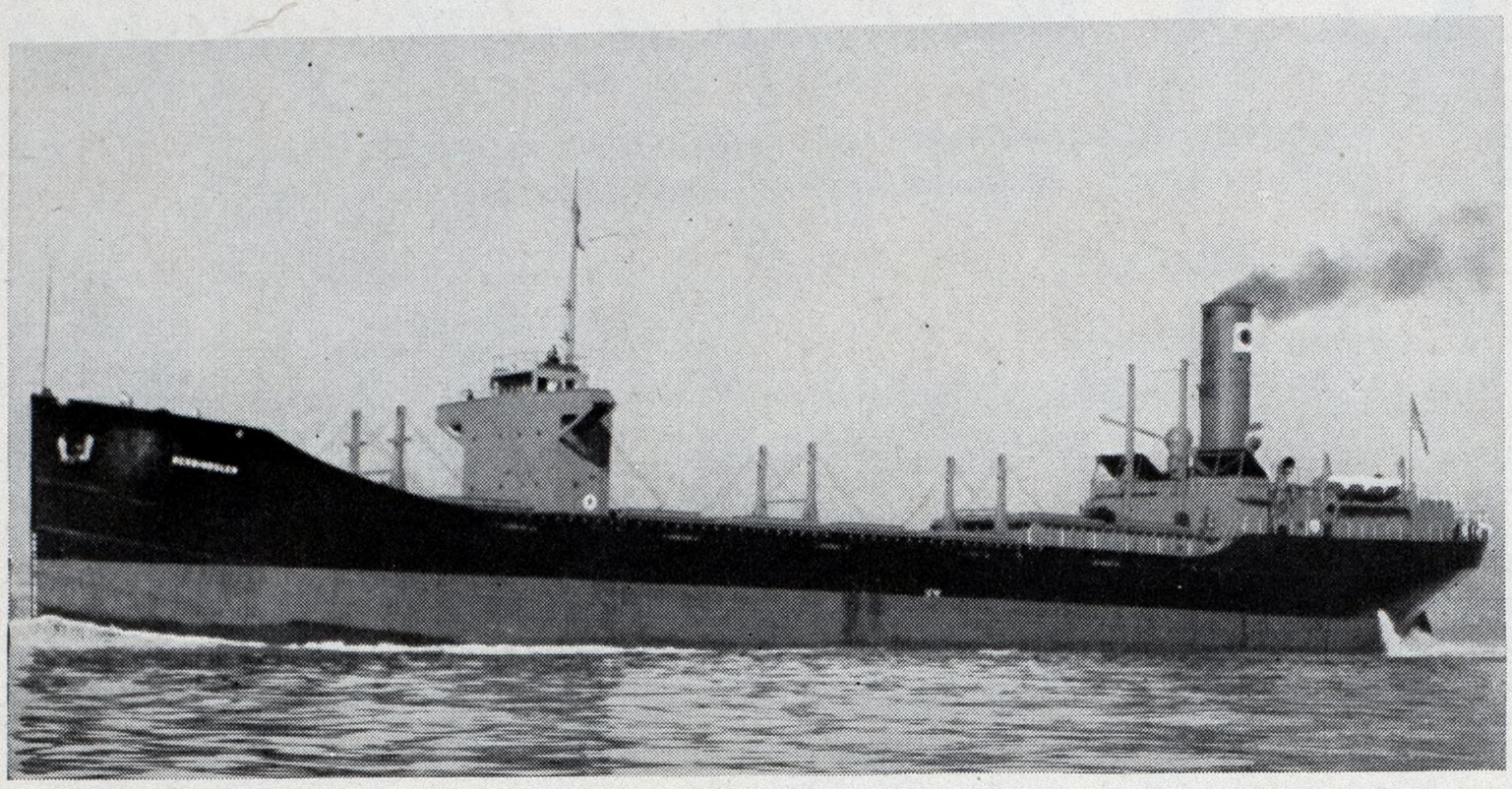
That there is a constant growth and expansion of transportation by water in the domestic commerce of the United States is well illustrated by this latest fast and trim looking addition to the fleet of the New England Steamship Co.

Popularity of the islands of Martha's Vineyard and Nantucket off the southern Massachusetts shore has necessitated the building of four modern vessels for this service within five years. The first two now known as the MARTHA'S VINEYARD and NANTUCKET were built at the Bath Iron Works, Bath, Me. in 1924 and 1925 respectively. The third known as the NEW BEDFORD was built by the Bethlehem Shipbuilding Corp. at the Fore River plant in Quincy, Mass.

Now the NAUSHON also built at Fore River in 1929 is added to the fleet. This vessel is larger and is fitted with passenger accommodations which fit her for winter service on other routes of the company.



BERWINDGLEN—Collier—Coastwise—Single Screw—Steam



Name—BERWINDGLEN
Owner—Wilmore Steamship Co.
Builder—Fore River Plant, Beth. S. B. Corp.
Naval Architect—Bethlehem S. B. Corp.
Launched—April 22, '29; completed, July 23, '29.
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 366 feet 6 inches; length between perpendiculars, 350 feet; breadth molded, 50 feet; depth molded, 30 feet 3 inches; draft to summer load line, 24 feet $2\frac{13}{16}$ inches; displacement loaded, 9640 tons; gross tonnage, 4411; net tonnage, 2750; cargo capacity, 7400 tons of coal; cargo capacity in cubic feet, 317,-646; bunker fuel capacity in tons of coal, 300; speed, 11 knots.

MACHINERY PARTICULARS

Main Engine—One three-cylinder triple-expansion steam engine built by Hooven, Owens, Rentschler Co. Size, diameter of cylinders, 22 x 41½ x 72 inches x 48 inches stroke. Indicated horsepower, 2200 at 80 revolutions.

Boilers—Two, scotch type, built by the Sparrows Point plant, Bethlehem Shipbuilding Corp. Size, 16 feet 9 inches in diameter x 11 feet 6 inches long; heating surface, total two boilers, 7198 square feet; air heaters, Howden, total 2584 square feet; working boiler pressure 180 pounds per square inch; fuel, pulverized coal, with Fuller-Lehigh Co. pulverizers and Babcock & Wilcox combination coal and oil burners of Lodi type.

Electric Generators—Two, Westinghouse, each 10 kilowatts, 125 volts, 500 revolutions per minute, driven by B. F. Sturtevant Co. single vertical 5 x 5 inches steam engines.

AUXILIARY EQUIPMENT

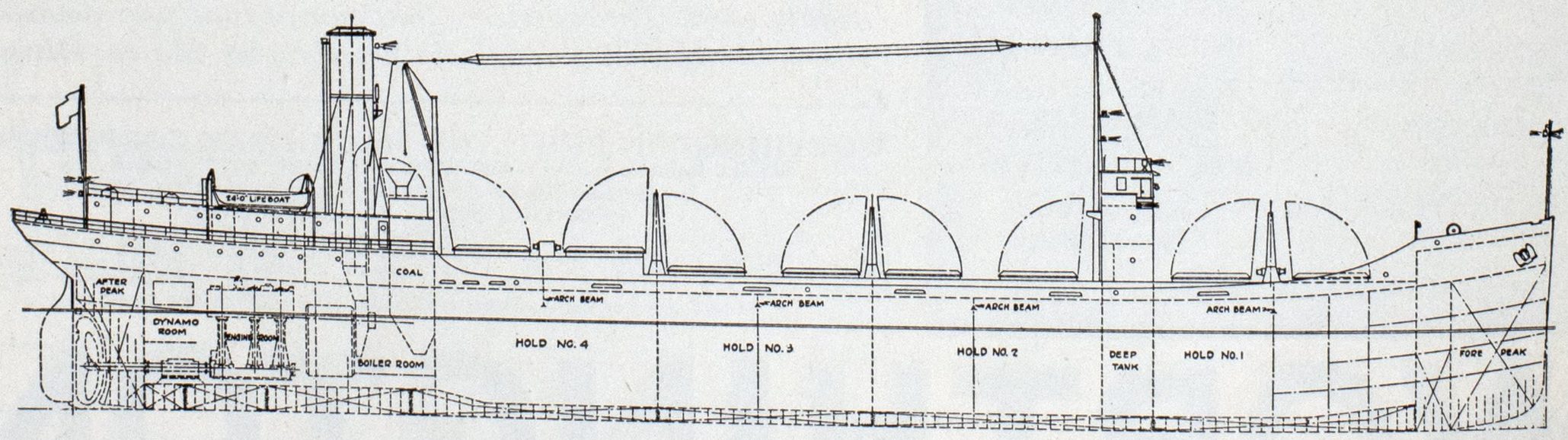
Manufacturers of:

Pumps—Worthington 9; Morris 2; Warren 1
Windlass—Bethlehm Shipbuilding Corp.
Winches—Lidgerwood Mfg. Co.
Steering Engine—Bethlehem S. B. Corp.
Propellers—Cramp's
Refrigeration—Brunswick-Kroeschell Co.
Turbo-Generator Sets—Kearfott
Fans—B. F. Sturtevant Co.
Soot Blowers—Diamond Power Specialty Corp.
Condenser—Bethlehem Shipbuilding Corp.
Feed Heater—Griscom-Russell Co.
Coal Crusher Engine—Hyde Windlass Co.
Valves & Fittings—Crane Co.
Batteries—Electric Storage Battery Co.
Marine Hardware—H. S. Getty Co., Inc.
Contra Rudders—Th. Goldschmidt Corp.
Radio Compass—Mackay Radio & Tel. Co.
Life Saving Equip.—Welin Davit & Boat Corp.

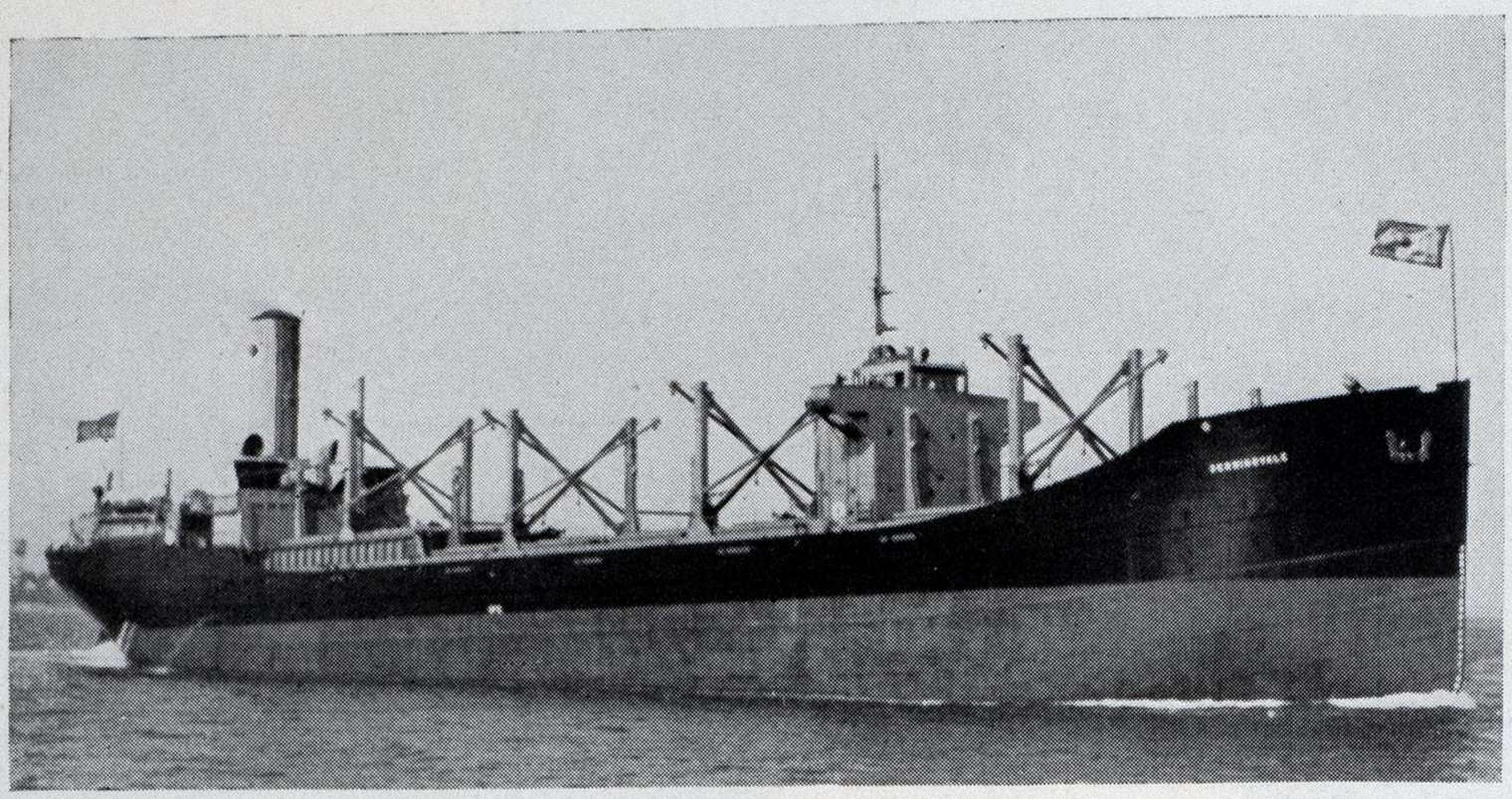
Theodore Ferris, the well known New York naval architect, represented the owners and reviewed the shipyard's plans. Special attention was given to the design of the best possible form of hull and models were both towed and self-propelled at the tank in Washington. Contra rudder indicated in model tests a saving of 17 per cent at 10 knots speed.

DESCRIPTION

A single screw collier designed to meet the special requirements of the coal trade between Hampton Roads, Va. and New England. This vessel has a triple expansion steam engine and two Scotch type boilers, burning pulverized coal. Large hatches and high hatch coamings permit loading to capacity without trimming.



BERWINDVALE—Collier—Coastwise—Single Screw—Steam



Name—BERWINDVALE
Owner—Wilmore Steamship Co.
Builder—Fore River Plant, Beth. S. B. Corp.
Naval Architect—Bethlehem S. B. Corp.
Launched—June 8. '29; completed, Aug. 21, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 366 feet 6 inches; length between perpendiculars, 350 feet; breadth molded, 50 feet; depth molded, 30 feet 3 inches; draft to summer load line, 24 feet $2\frac{13}{16}$ inches; displacement loaded, 9640 tons; gross tonnage, 4411; net tonnage, 2750; cargo capacity, 7400 tons of coal; cargo capacity, cubic feet, 317,294; bunker fuel capacity, 300 tons of coal; speed, 11 knots.

MACHINERY PARTICULARS

Main Engine—One, cross compound (high pressure, low pressure, and reverse) geared Curtis turbine built by Bethlehem Shipbuilding Corp.; Falk reduction gears; size, 2000 shaft horsepower at 80 revolutions per minute.

Boilers—Two, Babcock & Wilcox water tube marine boilers with a total heating surface for the two, 5826 square feet; air heaters with a total heating surface of 4370 square feet; working boiler pressure, 250 pounds per square inch with a total temperature of 600 degrees Fahr.; superheaters of interdeck type of 582 square feet of total heating surface and 200 degrees superheat; fuel, pulverized coal with Fuller-Lehigh Co. pulverizers and Babcock & Wilcox combination coal and oil burners of Lodi type.

Electric Generators—Two, Westinghouse, each 10 kilowatts, 125 volts, 500 revolutions per minute, driven by B. F. Sturtevant Co. single vertical 5 x 5 inches steam engines.

AUXILIARY EQUIPMENT

Manufacturers of:

Pumps—Worthington (10); Morris (2); Warren (1); Moore (1)
Windlass—Bethlehem Shipbuilding Corp.
Winches—Lidgerwood Mfg. Co.
Steering Eng.—Bethlehem Shipbuilding Corp.
Propellers—Cramp's
Refrigeration—Brunswick-Kroeschell Co.
Fans—B. F. Sturtevant, Moore
Turbo-Generator Sets—Kearfott.
Soot Blowers—Diamond Power Specialty
Thrust Bearing—Kingsbury Machine Works
Condenser—Bethlehem Shipbuilding Corp.
Feed Heater—Griscom-Russell Co.
Oil Coolers—Griscom-Russell Co.
Coal Crusher—Webster Mfg. Co.
Coal Crusher Eng.—Hyde Windlass Co.
Valves and Fittings—Crane Co.
Batteries—Electric Storage Battery Co.
Marine Hardware—H. S. Getty & Co. Inc.
Contra Rudders—Th. Goldschmidt Corp.
Radio Compass—Mackay Radio & Tel. Co.
Oil Purifiers—Sharples Specialty Co.
Life Saving Equip.—Welin Davit & Boat Corp.

DESCRIPTION

This vessel is exactly like her sister vessel the BERWINDGLEN in hull dimension but differs in cargo handling and in having geared turbine drive and water tube boilers. Pulverized coal is used for fuel. The design in each case was prepared by the shipyard and reviewed by Theodore Ferris for the owner.

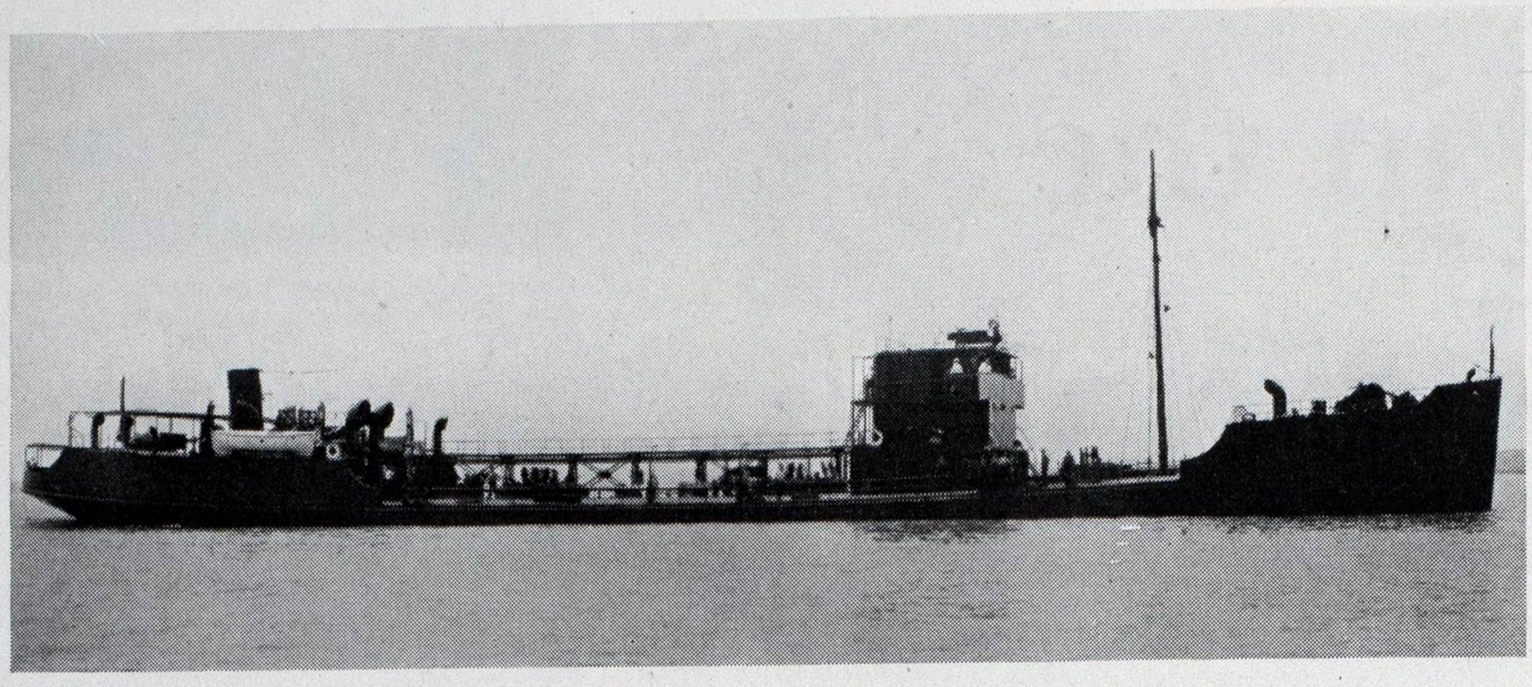
REMARKS

Before deciding upon the pulverized coal system a study was made of all available information. The system installed in this vessel and the BERWINDGLEN embodies the best knowledge and experience at hand at the time.

The coal bunker is located at the forward end of the boiler room, is rectangular in section and extends from an enclosure on the upper deck down to about 11 feet from the fire room floor. At the bottom are two pockets with sides sloping down to the feeder inlets of the two pulverizers. Coal is bunkered without trimming through the hatches, and passes to the pulverizer feeders by gravity.

Pulverizers are of Fuller-Lehigh table type, the coal being fed to the mill by an adjustable motor driven feeder. Each pulverizer supplies one boiler. Heated air is discharged to the mill by an independent pulverizer fan. Individual coal pipes lead from the top of the mill, one for each burner. The pipes are alike as nearly as possible and there are no mechanical distributing devices.

TIDEWATER—Tanker—Coastwise—Single Screw—Diesel Electric



Name—TIDEWATER
Owner—Tidewater Oil Co.
Builder—The Pusey and Jones Corp.
Launched—April 23, '29; completed, July 1, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 267 feet; length between perpendiculars, 255 feet; breadth molded, 44 feet; depth molded, 18 feet 6 inches; draft, 15 feet 6 inches; displacement loaded, 3650 tons; gross tonnage, 1815; net tonnage, 1078; cargo capacity, 935,773 gallons; bunker fuel capacity in barrels, 468; speed 10½ knots.

MACHINERY PARTICULARS

Main Engines—Two 6-cylinder, 4-cycle, solid injection, trunk piston built by I. P. Morris and De La Vergne. Each engine has a 17-inch bore and 24-inch stroke and develops 625 brake horsepower at 225 revolutions per minute.

Main Generators—Two General Electric, direct current, each of 410 kilowatts 250 volts at 225 revolutions per minute and direct connected to each of the main diesel engines described. Two 45 kilowatt exciters at 240 volts.

Propelling Motor—One, General Electric, 1000 shaft horsepower at 130 revolutions per minute and 500 volts.

Auxiliary Generator—One, General Electric, 45 kilowatt at 350 revolutions per minute and 240 volts, direct connected to a 4-cycle, 3-cylinder Winton diesel engine rated at 100 horsepower at 300 revolutions per minute.

DESCRIPTION

This vessel is built on a combination of the Isherwood longitudinal system and transverse framing. There are twelve cargo oil tanks and one cofferdam. In the forward hold are four lubricating oil tanks with a total capacity of 846 barrels. The main cargo pump room is located aft of the cargo tanks.

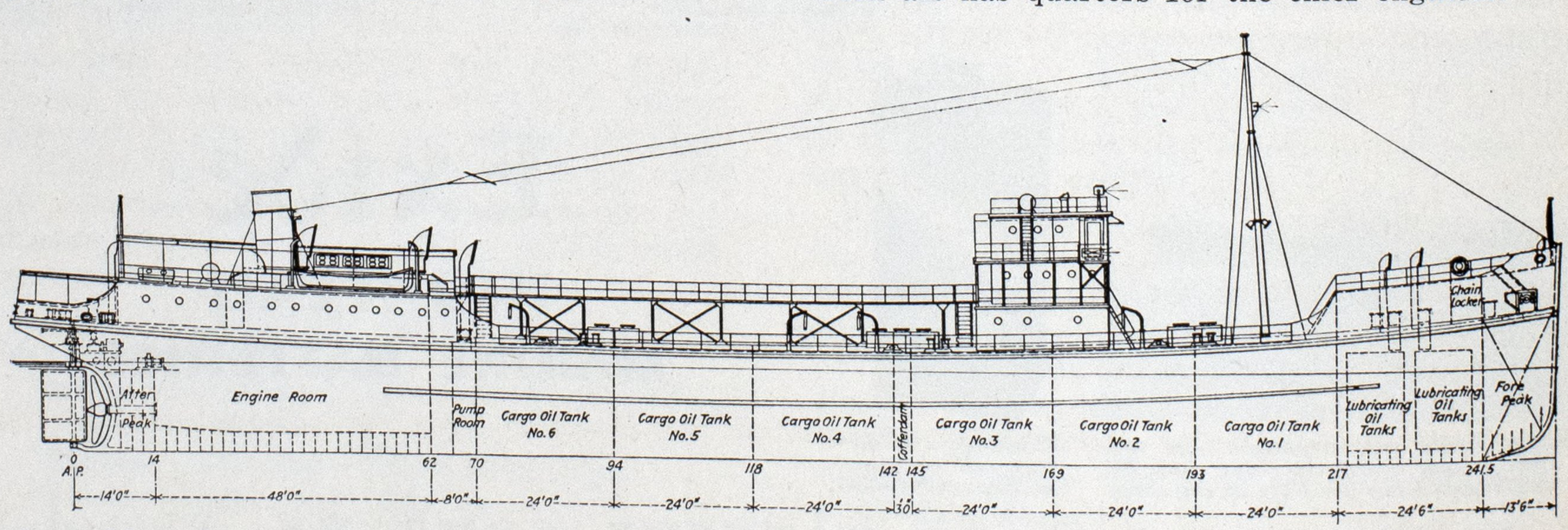
AUXILIARY EQUIPMENT

Manufacturers of:
Pumps—Northern Pump Co.
Windlass—Allan Cunningham
Capstan—Allan Cunningham
Steering Gear—Electric—Allan Cunningham
Propellers—The Pusey & Jones Corp.
Refrigeration—Brunswick-Kroeschell
Anchor Chain—Baldt Anchor Chain & Forge
Pump Motors—Electro-Dynamic Co.
Electric Range—Edison Electric Appliance Co.
Fire Lighting—Lux CO_2-Walter Kidde & Co.
Valves & Fittings—Crane Co.
Thrust Bearings—Kingsbury Machine Works
Pressure Regulators—Leslie Co.
Blowers & Fans—Ilg Electric Ventilating Co.
Oil Purifiers—Sharples Specialty Co.
Searchlights—Sperry Gyroscope Co. Inc..
Davits—Welin Davit & Boat Corp.

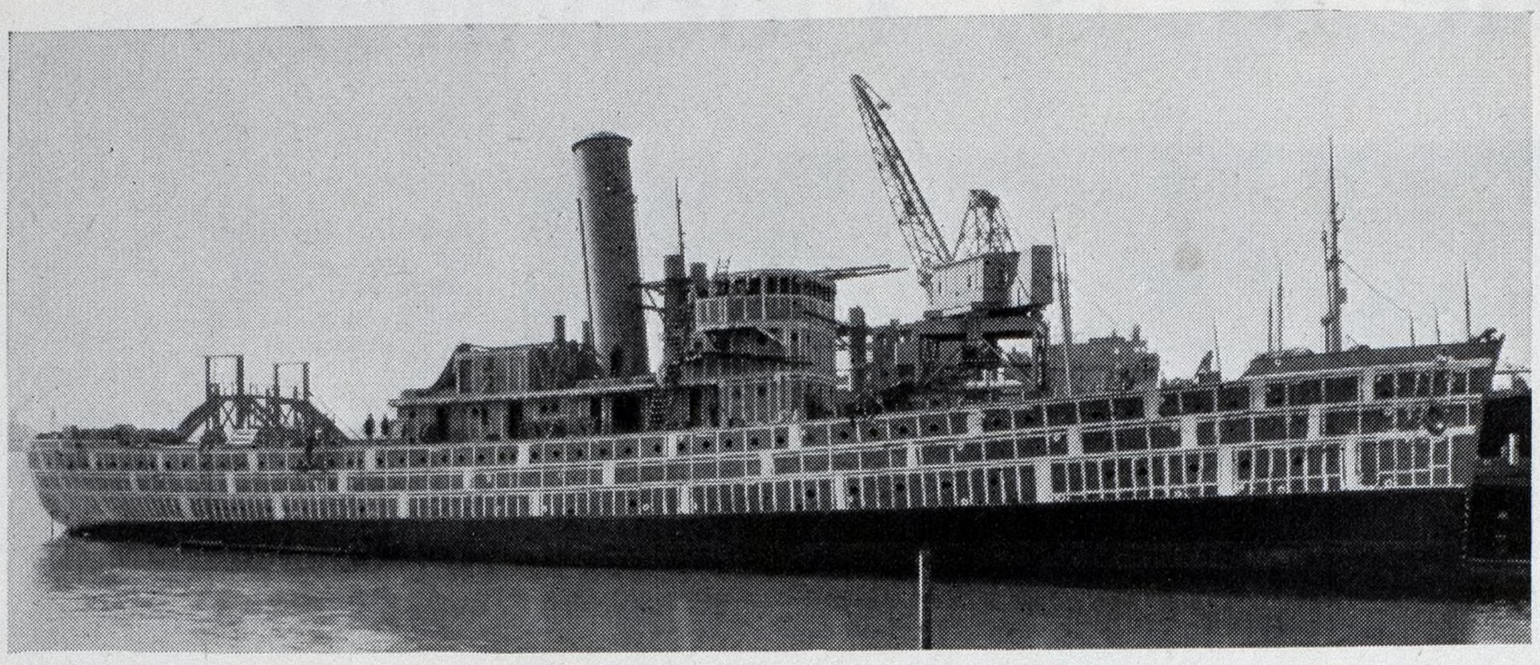
REMARKS

In the bridge house amidships on the main deck there is a compartment for storing bottles of CO_2 for fire extinguishing in all parts of the vessel.

The captain's room, office and bath as well as rooms and bath for the first and second mates and steward are located on the bridge amidships. On the navigating bridge is located the wheel house, spare room and wireless operator's room. A long deck house on the main deck aft has quarters for the chief engineer.



ITASCA AND CLASS—Coast Guard Cutter—Single Screw—Electric



DESCRIPTION

Continuing to build up its fleet of modern vessels the United States Coast Guard awarded a contract for the construction of four additional cutters similar to the five of the CHELAN class, the last of which was completed in March 1929.

Name—ITASCA
Owner—United States Coast Guard
Builder—General Engineering & Dry Dock Co.
Naval Architect—United States Coast Guard
Launched—Nov. 16, '29; completed about June
Sister ships—SEBAGO, SARANAC and SHOSONE

The SEBAGO was launched on Jan. 15, 1930; the remaining two to follow in due course.

HULL PARTICULARS

Length over all, 250 feet; length between perpendiculars, 236 feet; breadth molded, 42 feet; depth molded, 26 feet 10 inches; draft, 15 feet; displacement loaded, 2000 tons; bunker fuel oil capacity, 90,000 gallons; cruising radius, 8000 miles; service speed, 16 knots.

MACHINERY PARTICULARS

Main Engine—One steam turbine direct connected to an a.c. generator. A synchronous motor direct connected to the propeller shaft. The turbine of impulse reaction type suitable for operation with 260 pounds of steam and 175 degrees superheat and 28½ inches of vacuum, at full speed of 3600 revolutions per minute will develop 3220 horsepower at the motor. Both turbine and generator designed and built by Westinghouse Electric & Mfg. Co.

Boilers—Two, Babcock & Wilcox water tube marine boilers with total heating surface of 6336 square feet and total superheating surface of 696 square feet; working pressure 260 pounds per square inch; fuel, oil.

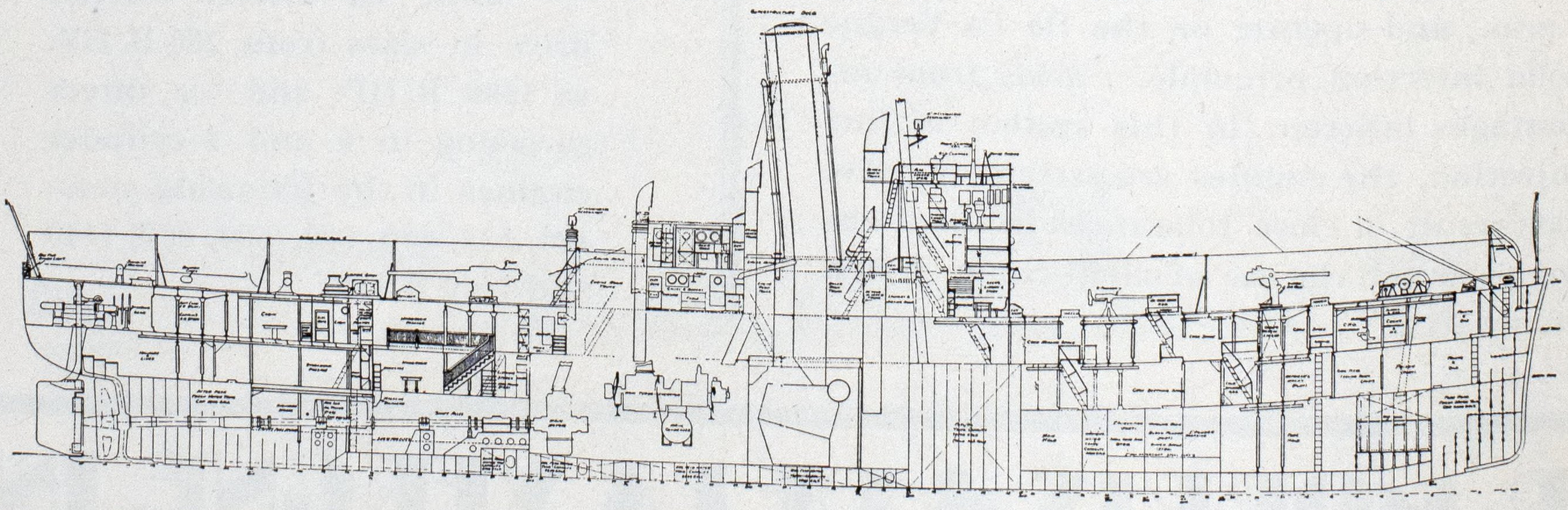
Main Generator—One, a.c. of revolving field type, with an output of 2600 kilowatts at 3600 revolutions per minute and 2300 volts, direct connected to turbine.

Main Motor—One, 3220 shaft horsepower of revolving field, salient pole, synchronous type, 3 phase, 60 cycles, 44 poles at 163.5 revolutions per minute direct connected to propeller shaft; built by Westinghouse Electric & Mfg. Co.

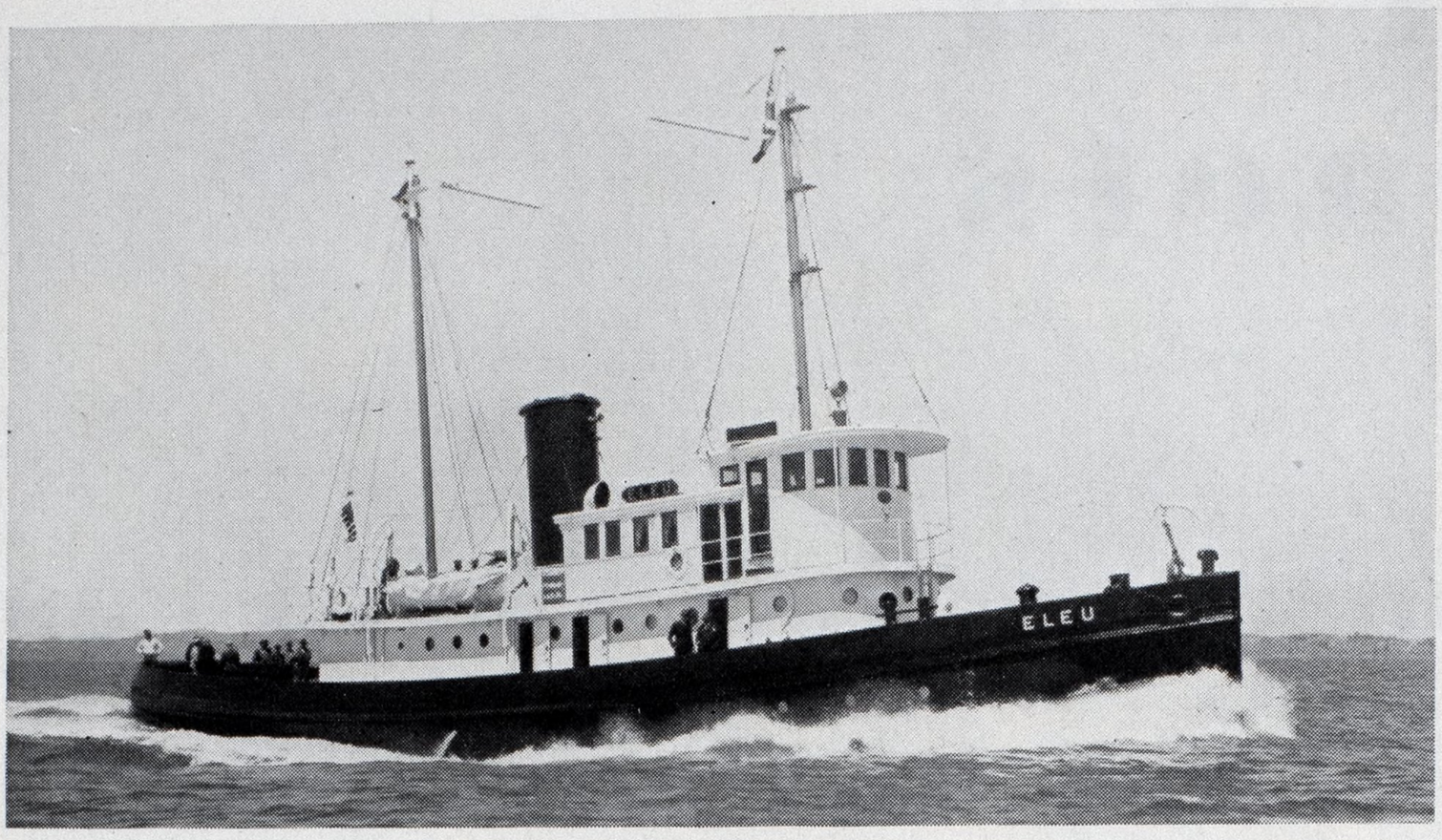
Auxiliary Power—Electric current for auxiliary power, excitation and lighting furnished by four generating sets; three turbine driven and one driven by an a.c. induction motor. The direct current generator at 240/120 volts is for excitation only. The a.c. generator rated at 187.5 k.v.a., 240 volts will supply all current for motor driven auxiliaries and for lighting. This equipment all Westinghouse.

AUXILIARY EQUIPMENT

Pumps—Warren Steam Pump Co.
Windlass—American Engineering Co.
Capstan—American Engineering Co.
Steering Gear—Electric-Hydraulic—Hele-Shaw
Pump—American Engineering Co.
Propeller—Hyde Windlass Co.
Induced Draft Fan—Sturtevant
Anchors—Baldt Anchors, Chain & Forge Co.
Oil Purifiers—De Laval Separator Co.
Valves & Fittings—Powell
Revolution Counters—Cummings Mach. Wks.
Soot Blowers—Diamond Power Specialty
Gyro Compass Equipment—Sperry
Searchlights—Sperry
Windows—Kearfott Engineering Co.
Davits—Welin Davit & Boat Corp.



ELEU—Ocean Going Tug—Twin Screw—Diesel



Name—ELEU
Owner—Inter-Island Steam Navigation Co.
Builder—Union Plant, Beth. S. B. Corp.
Naval Architect—E. P. McRitchie
Launched—Mar. 22, '29; completed, May 29, '29.
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 125 feet; length between perpendiculars, 117 feet; breadth molded, 28 feet; depth molded, 16 feet; draft, 12 feet 9 inches; displacement loaded, 567 tons; gross tonnage, 335; net tonnage, 150; bunker fuel oil capacity, 120 tons; speed, 12½ knots.

MACHINERY PARTICULARS

Main Engines—Two, Fairbanks-Morse & Co. four-cylinder two-cycle diesel engines. Size, each engine 560 brake horsepower at 257 revolutions per minute; cylinder diameter, 16 inches; stroke, 20 inches. Each of the main engines has a built-in compressor.

Electric Generator—One, 40-kilowatt generator, also two-stage compressor, clutch connected, are driven by one 60-horsepower, 800 revolutions per minute, diesel engine. The entire outfit was built by Fairbanks, Morse & Co. The capacity of the compressor is 50 cubic feet a minute at 250 pounds pressure.

AUXILIARY EQUIPMENT

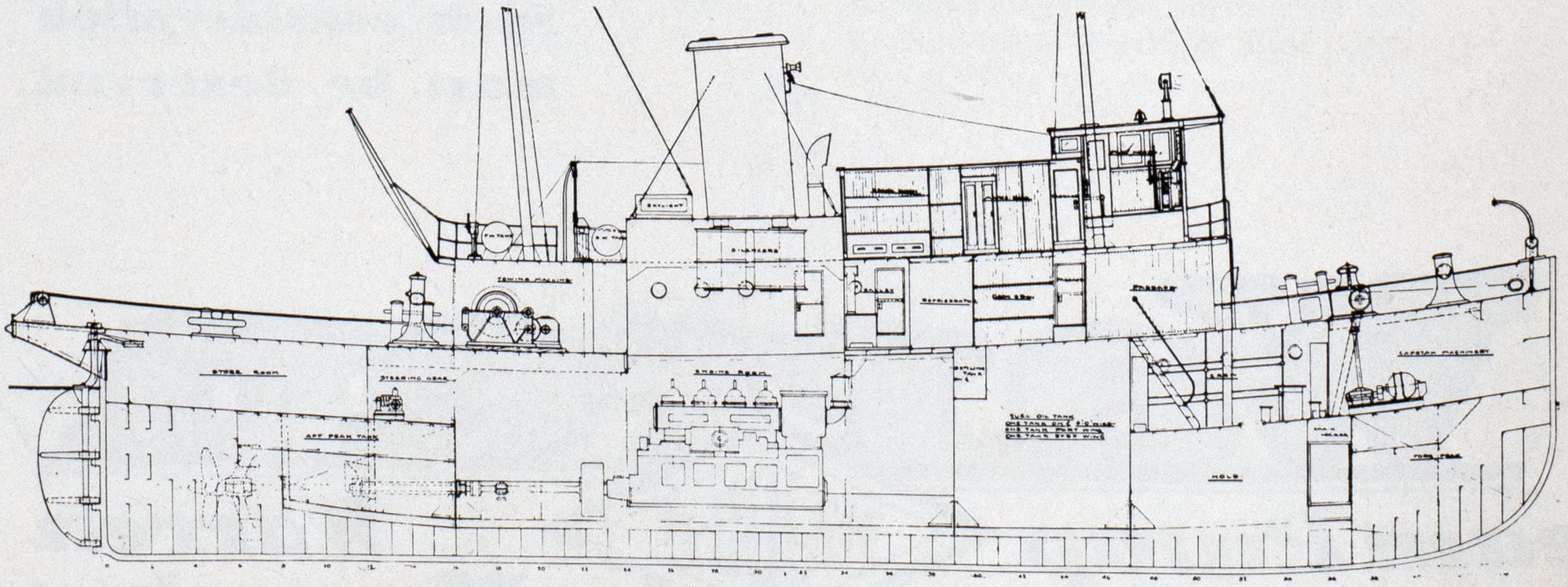
Manufacturers of:
Pumps—Fairbanks, Morse & Co.
Windlass—Electric, Allan Cunningham
Winches—Electric, Allan Cunningham
Steering Engine—Electric, Allan Cunningham
Propellers—Union Plant, Beth. S. B. Corp.
Towing Machine—Electric, Allan Cunningham
Hand Steerer—Allan Cunningham
Oil Purifier—De Laval
Telegraphs—Chas. Cory & Son
Batteries—Edison (96) A-8-H Cells

The ELEU is of substantial steel construction and in lines, size and power is able to face the heaviest weather anywhere with safety. The pilot house and the quarters over the steel deck house are built of pine with teak doors and trim. Officers quarters are in this house and quarters for the crew are forward.

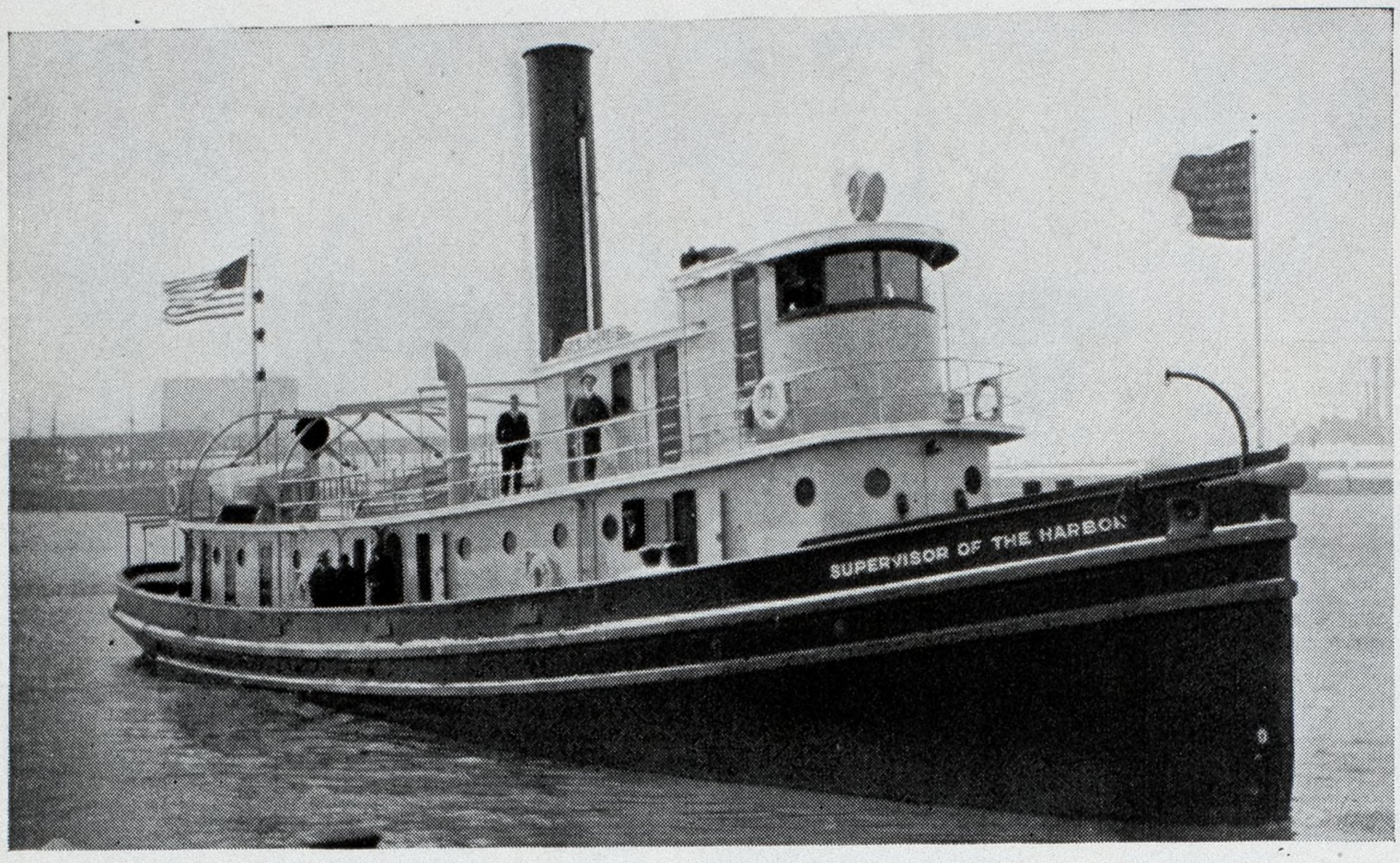
After completing her trials on May 29, 1929, the ELEU on May 30, put to sea towing a steel barge 160 feet long by 44 feet wide. The trip to Honolulu was completed in 10½ days.

DESCRIPTION

A steel twin screw, large, powerful diesel tug, not only a practical and economical vessel, but especially attractive in her general trimness, good proportions and arrangement throughout. The ELEU has been in service in the Hawaiian islands since her completion last summer, arriving in June.



ARGUS—Patrol Boat—Harbors—Single Screw—Steam



DESCRIPTION

This modern patrol boat was especially built with the view of patrolling the harbor of New York as far seaward as eight miles southeast of Scotland lightship, and also for continuous duty day and night, including Sundays and holidays, supervising the dumping of sea scows with waste material for deposit outside the harbor.

Name—ARGUS
Owner—War Department
Builder—Spedden Shipbuilding Co. Inc.
Naval Architect—Marine design Division office of Chief of Engineers
Launched—Sept. 5, '29; completed, Jan. 22, '30
Classification—None, built to rules of American Bureau of Shipping

HULL PARTICULARS

Length over all, 121 feet 5½ inches; length between perpendiculars, 114 feet; breadth molded, 24 feet; depth molded, 13 feet 3 inches; draft forward, 8 feet 7½ inches, aft, 11 feet 8 inches; displacement loaded, 378 long tons; bunker fuel capacity, 53.3 long tons of oil; speed, 13 statute miles per hour.

MACHINERY PARTICULARS

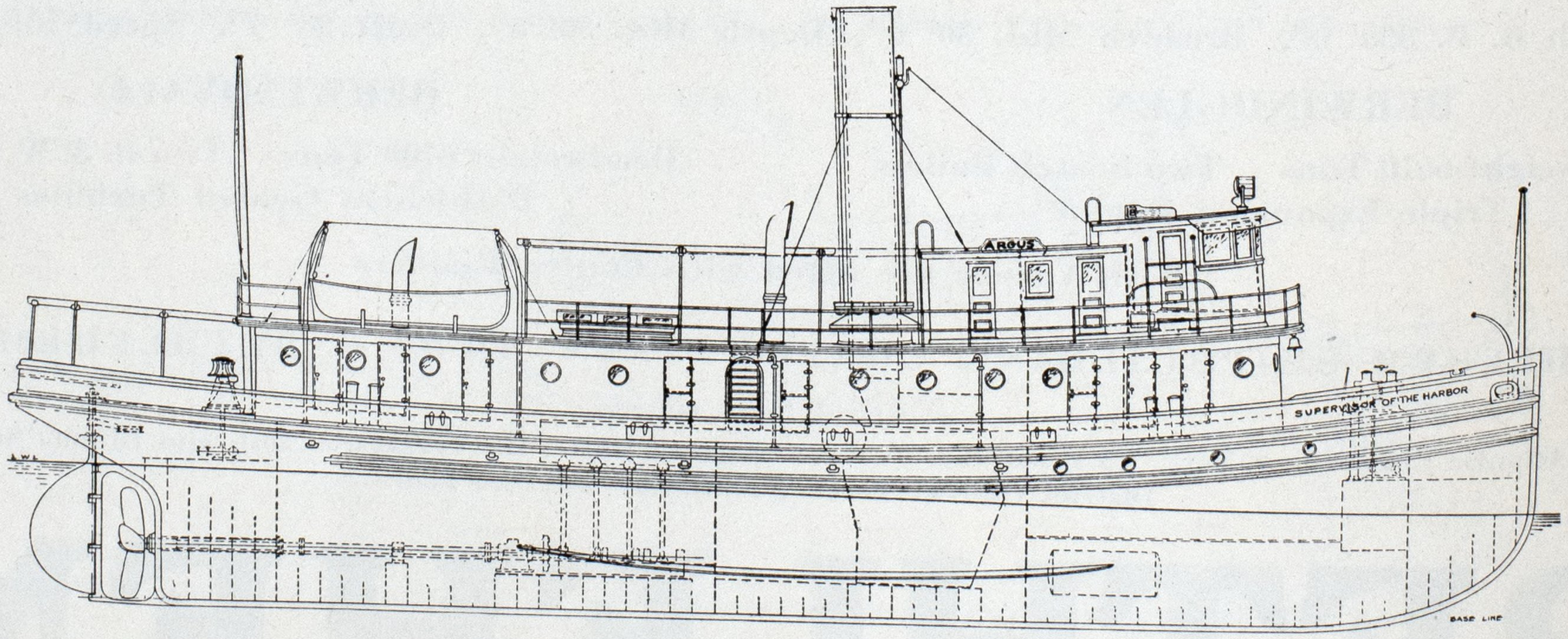
Main Engine—One, 3-cylinder, inverted, triple expansion steam engine built by Spedden Shipbuilding Co. Inc.; size, 13½ x 22 x 36 inches x 26 inches stroke; indicated horsepower 550 at 125 revolutions per minute.

Boiler—One, Babcock & Wilcox water tube marine boiler with a total heating surface of 2530 square feet; working pressure, 225 pounds per square inch; fuel, oil; oil burning equipment supplied by Babcock & Wilcox Co., Mayflower type.

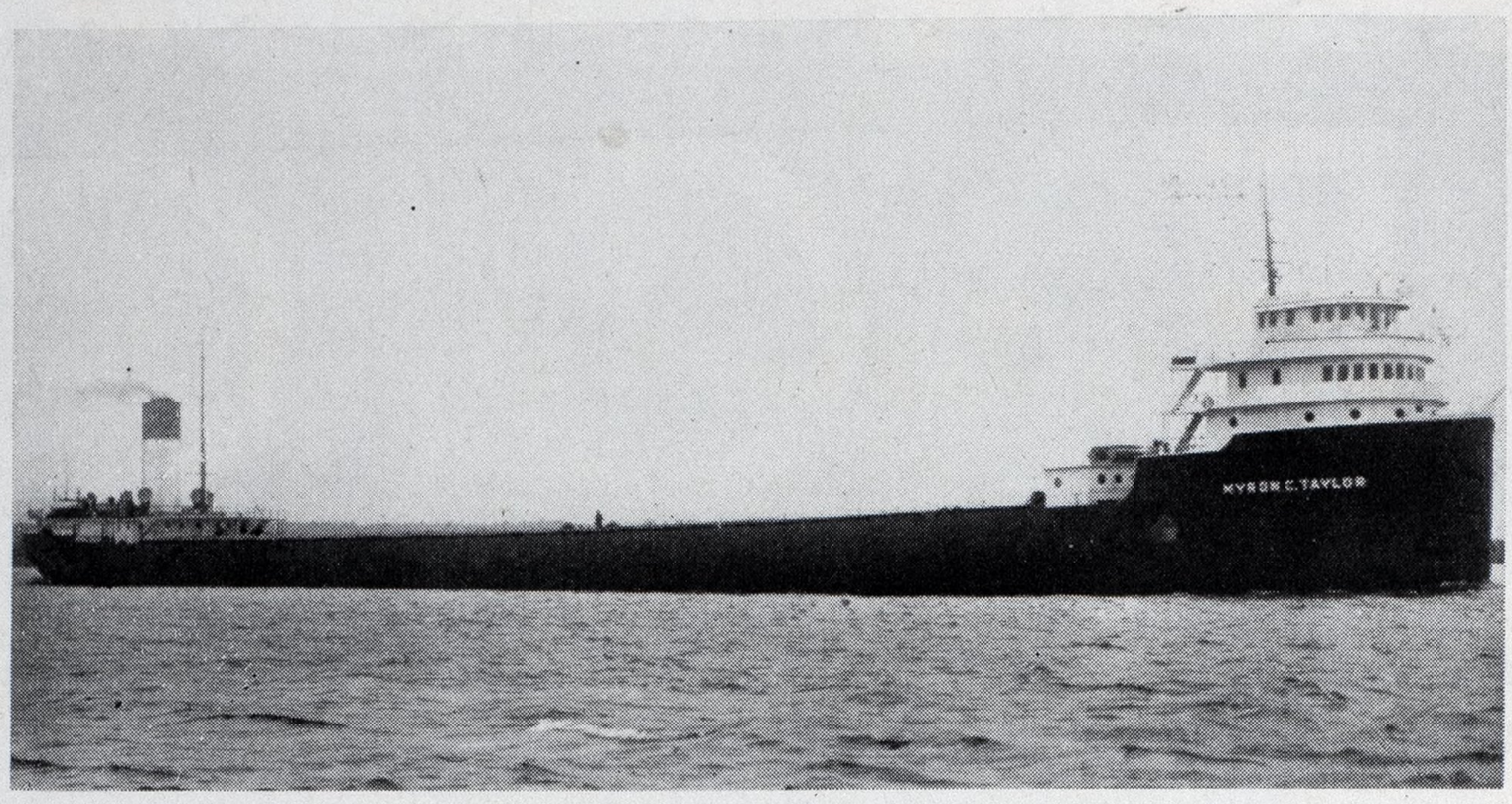
AUXILIARY EQUIPMENT

Manufacturers of:
Pumps—M. T. Davidson Co.
Windlass—American Engineering Co.
Gypsy—American Engineering Co.
Steering Engine—American Engineering Co.
Propeller—Spedden Shipbuilding Co. Inc.
Refrigeration—Frigidaire Corp.
Superheaters—Babcock & Wilcox Co.
Electric Generator—General Electric Co.
Soot Blowers—Diamond Power Specialty

The construction of this vessel is of all steel for the hull and main deck house with only the upper deck house and pilot houses of wood. The living quarters, as well as the galley and messroom, are on the main deck, while the captain's and mates' quarters are on the upper deck adjacent to the pilot house.



MYRON C. TAYLOR—Freighter—Great Lakes—Single Screw—Steam



Name—MYRON C. TAYLOR
Owner—Pittsburgh Steamship Co.
Builder—Great Lakes Engineering Works
Launched—July 15, '29; completed, Aug. 27, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 604 feet; length between perpendiculars, 580 feet; breadth molded, 60 feet; depth molded, 32 feet; draft, 20 feet; displacement loaded, 18,870 short tons; gross tonnage, 7945; net tonnage, 6337; cargo capacity, 12,000 long tons; cargo capacity in cubic feet, 539,000; bunker fuel capacity, 408 short tons of coal; speed, 12 miles per hour.

MACHINERY PARTICULARS

Main Engine—One, triple expansion reciprocating steam engine built by the Great Lakes Engineering Works. Size, 24½ x 40 x 65 inches and 42-inch stroke; indicated horsepower, 2200 at 85 revolutions per minute.

Boilers—Two, Babcock & Wilcox water tube marine boilers with a total heating surface of 8504 square feet; working pressure, 190 pounds per square inch; grate surface, 150 square feet; fuel, coal hand fired.

AUXILIARY EQUIPMENT

Pumps—Dean Bros.; Elliott Co.
Windlass—Hyde Windlass Co.
Winches—Hyde Windlass Co.
Propellers—Great Lakes Engineering Works
Steering Engine—Hyde Windlass Co.
Refrigeration—Frick Co.
Electric Generators—Crocker-Wheeler generators and American Blower Co. engines.
Valves and Fittings—Crane Co.
Marine Hardware—The Dayton Mfg. Co.
Soot Blowers—Diamond Power Specialty Corp.
Contra Rudders—Th. Goldschmidt Corp.
Anchor Chain—National Malleable Co.
Gyro Compass—Sperry Gyroscope Co.

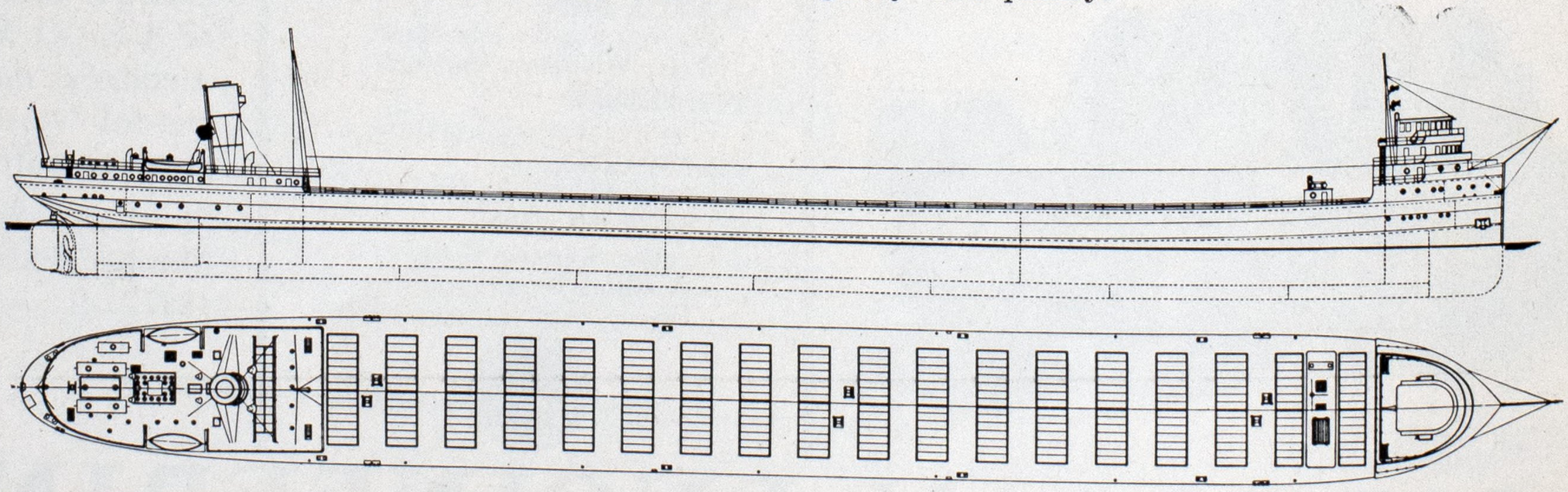
DESCRIPTION

This vessel has 18 hatches, each 38 feet wide and 12 feet fore and aft, fitted with sliding plate covers. The hull is divided into three compartments by two screen bulkheads. Total water ballast capacity is 8700 short tons carried in double bottom and side tanks. Steam is supplied by water tube boilers.

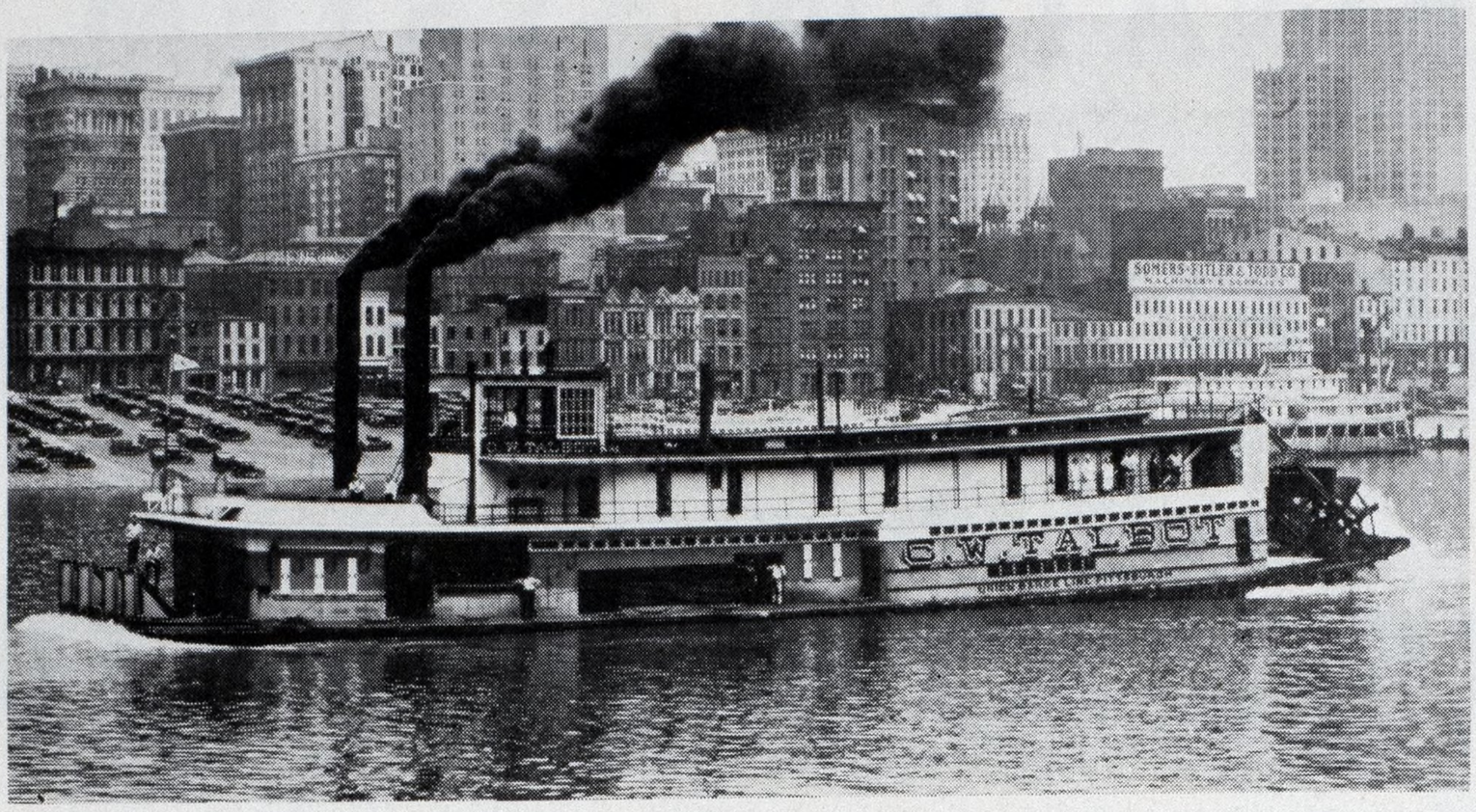
The MYRON C. TAYLOR, like the A. F. HARVEY, built at the same yard in 1927, is constructed on the Isherwood system of framing and is designed for carrying bulk cargoes of iron ore, coal, or grain. Side tanks have a slope so that at the bottom they are directly in a plumb line with the outboard hatch coamings.

Steel has been used for cabin partitions wherever possible and Plymetal, a metal faced ply wood, made by the Haskelite Mfg. Corp. has been used for panels for doors. Where wood partitions are used, they are carried to a steel coaming, so that no wood comes in contact with the steel deck.

There are two passenger rooms on the spar deck, forward, with a large hall in the center, and a private bath for each room. A deck house is located between Nos. 1 and 2 hatches, in which is installed passengers' dining room. galley and pantry.



C. W. TALBOT—River Towboat—Stern Wheel—Steam



DESCRIPTION

Three towboats of this type were built for the Union Barge Line Corp. for use on the Ohio and Mississippi rivers for transporting large tows of steel, coal and other products to points down river as far as Cairo and New Orleans. The hull, deck house, and pilot house are built of steel.

Name—C. W. TALBOT
Owner—Union Barge Line Corp.
Builder—Midland Barge Co.
Naval Architect—Midland Barge Co.
Launched—Dec. 15, '28; completed, April 8, '29
Sister Boats—S. N. Craig, and J. D. Ayres, launched respectively; Oct. 15, and Nov. 15, 1928; completed respectively; Jan. 25 and March 8, 1929

HULL PARTICULARS

Length overall, 176 feet 6 inches; length from head log to after transom, 151 feet; breadth molded, 34 feet; depth molded, 6 feet 6 inches; modified spoon bow; draft, 5 feet 6 inches forward, 4 feet 6 inches at stern; displacement loaded, 720 tons; rudders, three; gross tonnage, 416; net tonnage 294; crew, 24 men; bunker fuel capacity, 80 tons of coal; speed, running light from Pittsburgh to Point Pleasant, W. Va., a distance of 255 miles, time 29½ hours.

MACHINERY PARTICULARS

Main Engines—Two tandem compound condensing steam engines built by Treadwell Engineering Co. Size, 15 x 30 inches x 7 feet stroke; indicated horsepower between 720 and 850; revolutions per minute of the sternwheel, 20; sternwheel, 19 feet 2 inches in diameter x 22 feet wide, 13 buckets, 40 inches wide.

Boilers—Four western river boilers built by Acme Boiler Works. Size, 42 inches in diameter by 28 feet long, containing 51 flues, 7 inches in diameter; fuel coal; working steam pressure, 225 pounds per square inch.

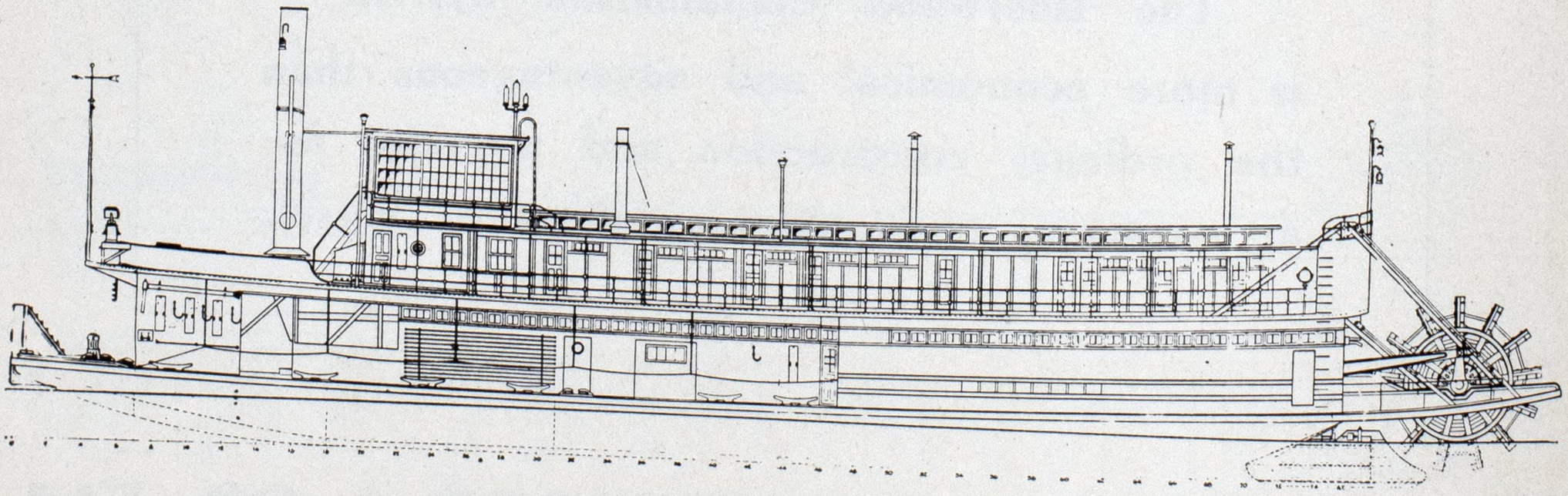
Electric Generators—Two steam turbine drive; one 30 horsepower, 15 kilowatts, the other 40 horsepower, 25 kilowatts; built by General Electric Co.

AUXILIARY EQUIPMENT

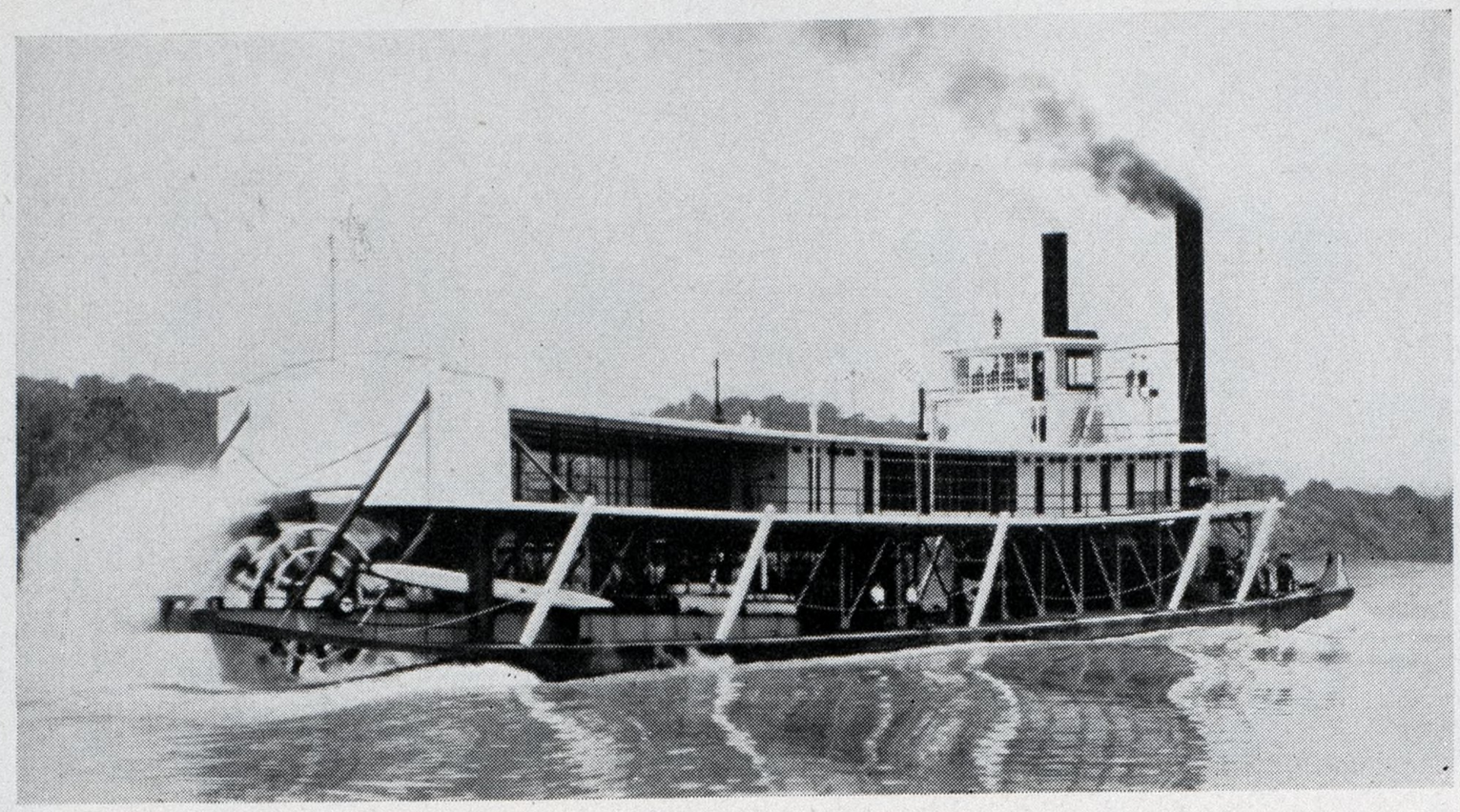
Pumps—Union Steam Pump Co.
Capstans—Riehl Mfg. Co.
Feed Water Heater—Davis Eng. Corp.
Stern Wheel Shaft—Treadwell Eng. Co.
Cranks and Pitmans—Treadwell Eng. Co.
Refrigeration—Pittsburgh Refrigeration Co.
Condenser—Worthington Pump & Mach. Corp.

The C. W. TALBOT and sister tow boats S. N. CRAIG, J. D. AYRES represent the latest development and refinements in the orthodox design of river boats.

Cabins are built of the best grade of white pine and poplar and are of composition panel construction. All outside walls of the cabin are double lined with vehisote with insulation between. Floors of bathrooms, galley and laundry are covered with Armstrong's marble inlaid linoleum. All floors in living quarters are of select maple.



LEBRIJA—River Towboat—Stern Wheel—Steam



DESCRIPTION

That American river towboat builders are recognized outside of their own country is indicated by this vessel, which was built for use on the Magdalena river in Colombia, South America. Her draft is unusually shallow, being only 2 feet 8 inches. Another feature of particular interest is the complete openness of the main deck.

Name—LEBRIJA
Owner—Columbian Steamship Co.
Builder—Marietta Mfg. Co.
Naval Architect—Marietta Mfg. Co.
Launched—Nov. 1928; completed, Jan. 1929
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 193 feet; length between perpendiculars, 168 feet; breadth molded, 42 feet; depth molded, 5 feet; draft, 2 feet 8 inches; gross tonnage, 560; camber main and boiler deck, 8 inches; camber hurricane deck, 12 inches.

MACHINERY PARTICULARS

Maine Engines—Two, tandem compound condensing steam engines built by Marietta Mfg. Co. Diameter high pressure cylinder, 14 inches; diameter low pressure cylinder, 28 inches; and a common stroke of 7 feet even. The indicated horsepower for both engines is about 750 for 20 revolutions per minute of the stern wheel. Each engine is connected to an outboard crank on the stern wheel by steel pitmans.

Boilers—Five boilers of Western rivers return tube type are fitted. These boilers were built by the Marietta Mfg. Co. and are 42 inches in diameter by 22 feet long. Oil is used for fuel. Oil burning equipment, Coen Co.

Electric Generators—There are two steam driven electric generators. One of 10 kilowatts capacity and one of 5 kilowatts. Both generating sets were built by the General Electric Co.

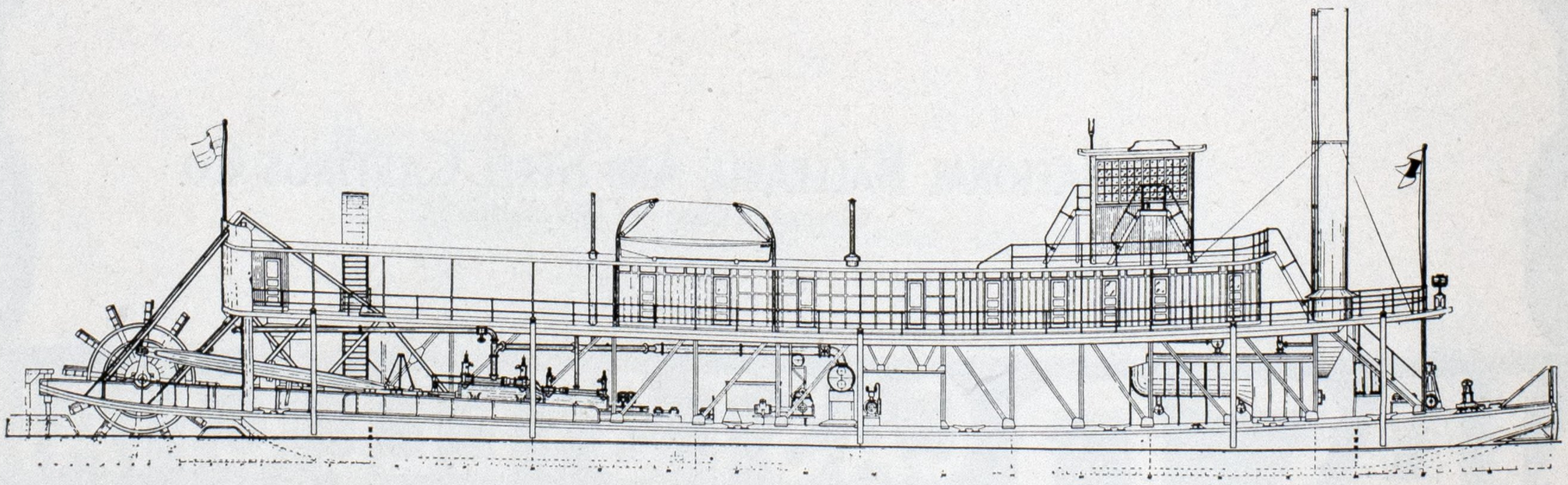
AUXILIARY EQUIPMENT

Manufacturers of:

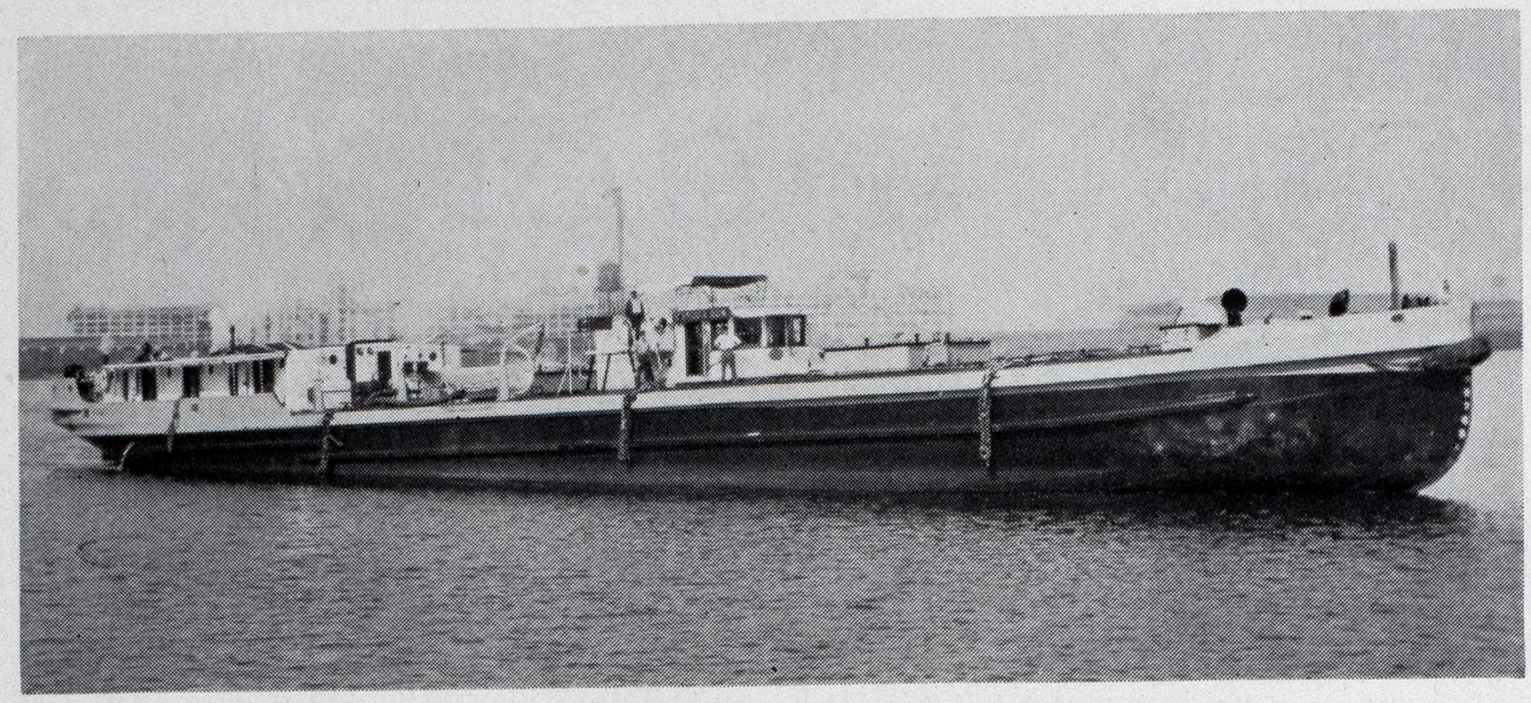
Pumps—Worthington Pump & Mach. Corp.
Capstans—Marietta Mfg. Co.
Steering Engine—Marietta Mfg. Co.
Refrigeration—Brunswick-Kroeschell Co.
Oil Burning Equipment—Coen Co., Inc.

The LEBRIJA is a steel hull river towboat of extremely shallow draft on account of the limiting conditions on the Magdalena river in Colambia, South America where she is now in service. The upper works of the boat are of wooden construction except for steel framing. The main deck is entirely open and the upper deck is screened and ventilated to withstand the heat of the tropics. The LEBRIJA has two sister ships, the PORCE and the FUNZA which are in the same service and which were also built by the Marietta Mfg. Co.

Even among river boats the LEBRIJA is unusual. The hull is strongly built of steel but is unusually shallow. There is a long sweep up at the bow and the stern wheel is extended well aft.



SENECA SUN & Class—Canal Tanker—Single Screw—Diesel Electric



Name—SENECA SUN
Owner—Sun Oil Co.
Builder—Sun Shipbuilding & Dry Dock Co.
Naval Architect—John W. Hudson
Launched—July 17, '29; compltd., July 20, '29.

Sister Vessels—CAYUGA SUN, for Sun Oil Co. and TIDEMOTOR for Tidewater Oil Co. launched in order as follows: July 10, Aug. 6, 1929; completed in order as follows: July 19, and Aug. 17, 1929

Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 196 feet 11¼ inches; length between perpendiculars, 188 feet 6 inches; breadth molded, 31 feet; depth molded, 11 feet 6 inches; draft, 9 feet; displacement loaded, 1150 tons; gross tonnage, 499.74; net tonnage, 307; cargo capacity, 6000 barrels; bunker fuel capacity in tons, 17; speed in service 9 knots.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder, 4-cycle diesel engines built by the Cooper-Bessemer Corp.; size, 9½-inch bore and 14-inch stroke; horsepower rated at 210 at 325 revolutions per minute.

Main Generators—Two, electric generators of 130 kilowatts with a 20-kilowatt exciter attached are each direct connected to the diesel engines described above. Westinghouse make.

Propulsion Motor—One electric motor of 300 to 320 brake horsepower furnished by Westinghouse is direct connected to the propeller.

Auxiliary Generator—One, 25-horsepower Cummins diesel engine driving a 15-kilowatt Diehl generator.

Boiler—One boiler for heating has been installed. The boiler is of the hot water type and is supplied by the American Radiator Co. It has 1850 square feet radius and coal is burned as fuel.

AUXILIARY EQUIPMENT

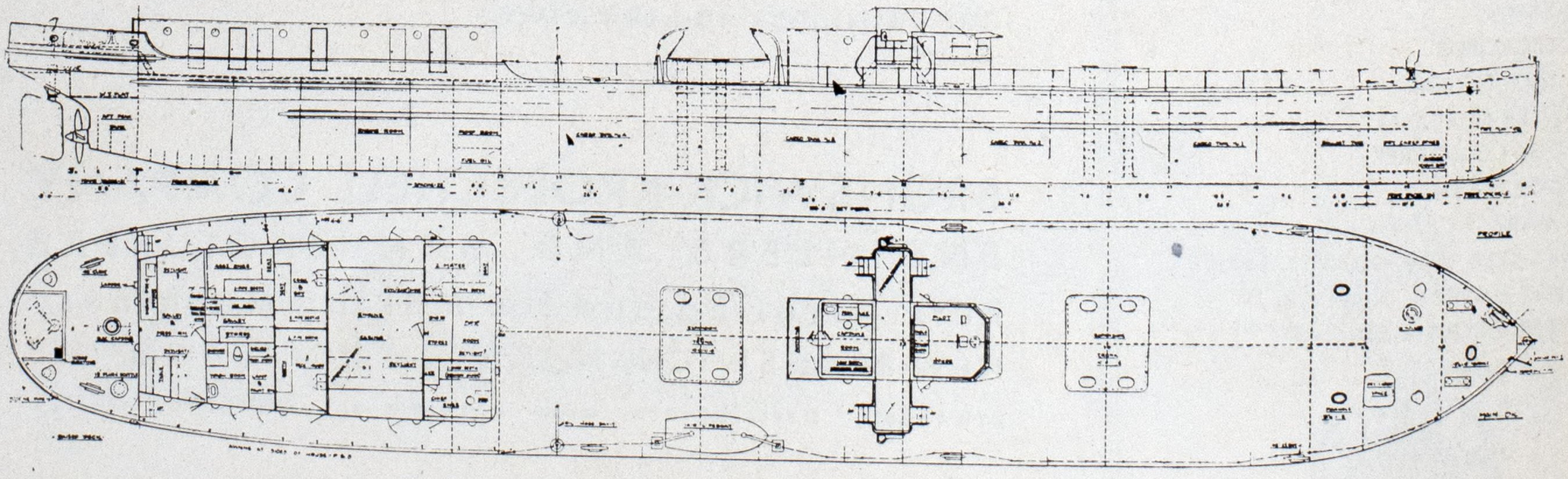
Manufacturers of:

Pumps—Blackmer-Nash; Martel; Northern
Windlass—American Engineering Co.
Capstan—American Engineering Co.
Steering Gear—American Engineering Co.
Propellers—Crown; Sun Shipbuilding Co.
Refrigeration—Kelvinator Co.
Valves and Fittings—Crane Co.
Soot Blowers—Diamond Power Specialty Corp.
Pressure Regulators—Leslie Co.
Rudder Indicator—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Pilot House Control—Westinghouse
Switchboard—Westinghouse
Davits—Welin Davit & Boat Corp.

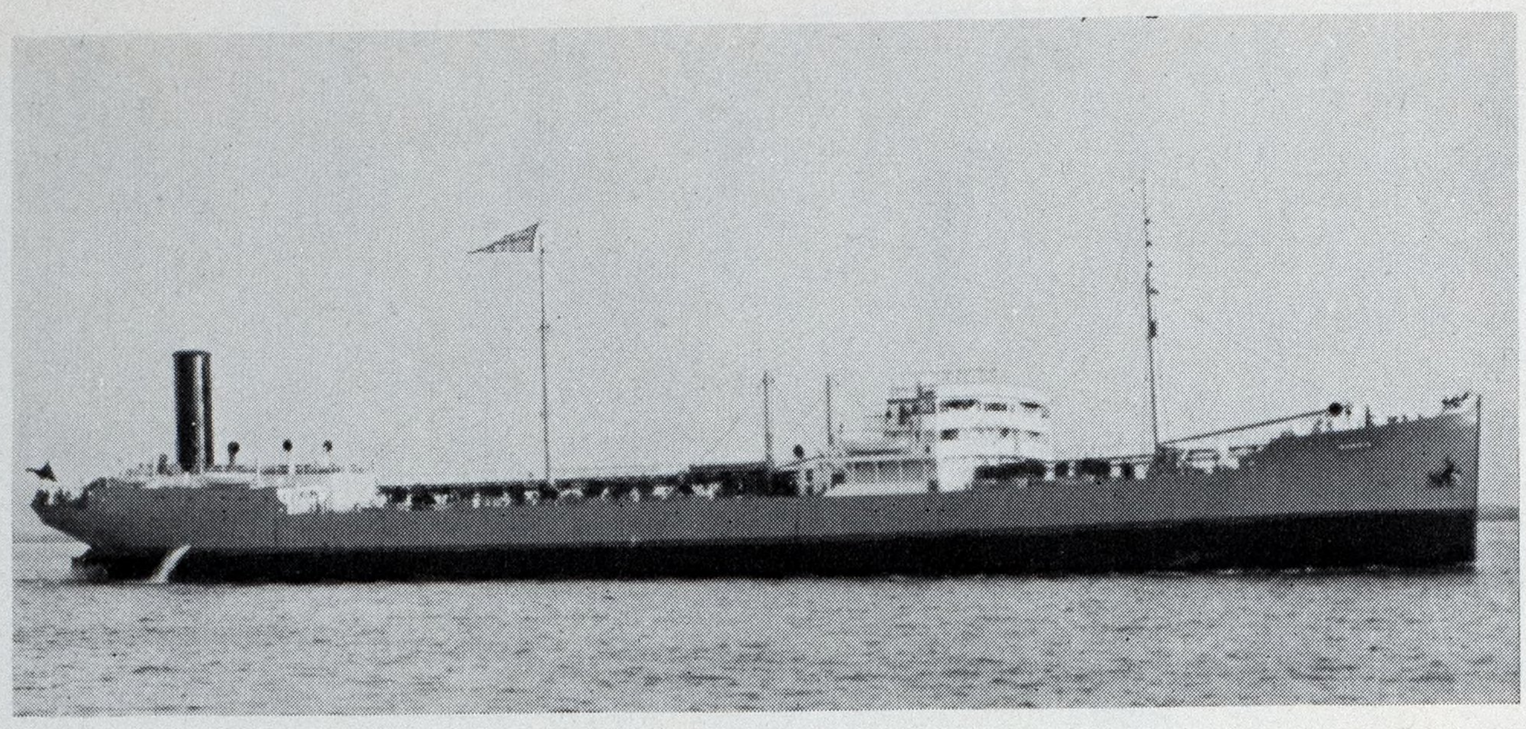
DESCRIPTION

A single screw shallow draft tanker with minimum deck obstructions for use on the barge canal from the Hudson to the Great Lakes. By use of electric propulsion positive and flexible control of speed and maneuvering is possible which is of special advantage in the canal.

These tankers are of the single screw, single deck, barge type for canal service. There are four main cargo tanks. The hulls are built on the Isherwood bracketless system of construction, particularly suitable for oil tankers.



PACIFIC SUN—Tanker—Ocean—Single Screw—Diesel



Name—PACIFIC SUN
Owner—Motor Tankship Corp.
Builder—Sun Shipbuilding & Dry Dock Co.
Naval Architect—John W. Hudson
Launched—Dec. 2, '29; completed, Dec. 27, '29
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 497 feet 10 inches; length between perpendiculars, 480 feet 6 inches; breadth molded, 65 feet 9 inches; depth molded, 37 feet; draft, 27 feet 2 inches; displacement loaded, 18,900 long tons; gross tonnage, 9085.91; net tonnage, 5563; cargo capacity, 113,196 barrels; bunker fuel capacity in tons, 1000; speed, 11 knots.

MACHINERY PARTICULARS

Main Engine—One, Sun-Doxford opposed piston oil engine built by Sun Shipbuilding & Dry Dock Co. This engine is of 4-cylinder 2-cycle type with attached scavenging pump. The cylinder diameter is 23.62 inches and the combined stroke is 91.32 inches. The horsepower at the shaft is 2800 at 80 revolutions per minute.

Boiler—One, marine water tube type built by the Foster Wheeler Corp. Size, 4000 square feet of heating surface; fitted for burning oil.

Auxiliary Engines—Two, 4-cylinder 120-horsepower Cooper Bessemer diesel engines each direct connected to a 75 k.w. General Electric generator.

DESCRIPTION

A single screw shelter deck tanker with poop and forecastle and nine main cargo tanks. This size and design of tanker has been found in service to be economical and adaptable. Consequently a number of sister vessels have been constructed. Built on the bracketless system and with slow speed diesel.

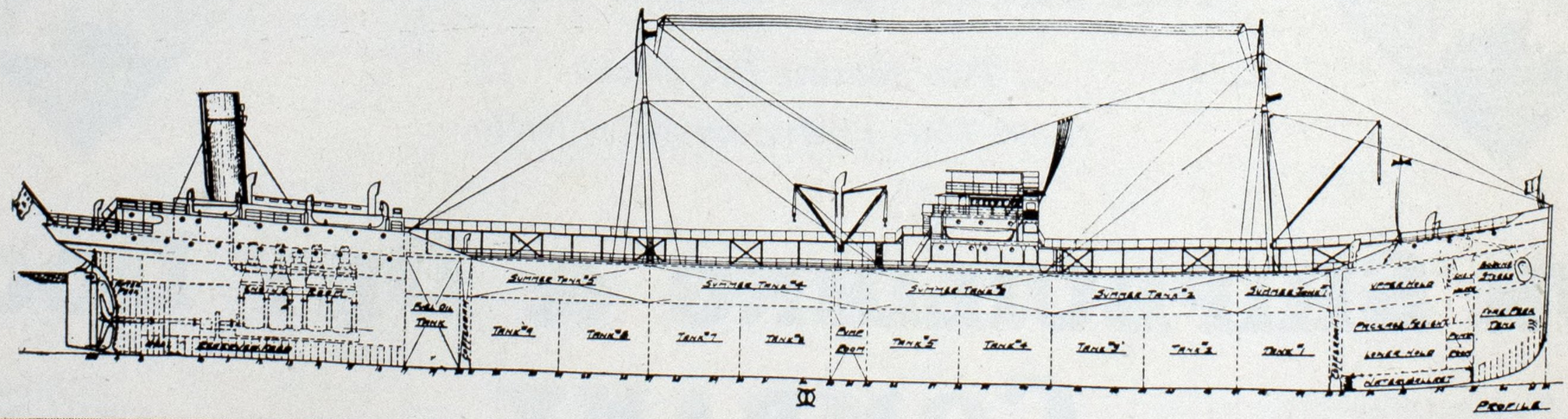
AUXILIARY EQUIPMENT

Manufacturers of:

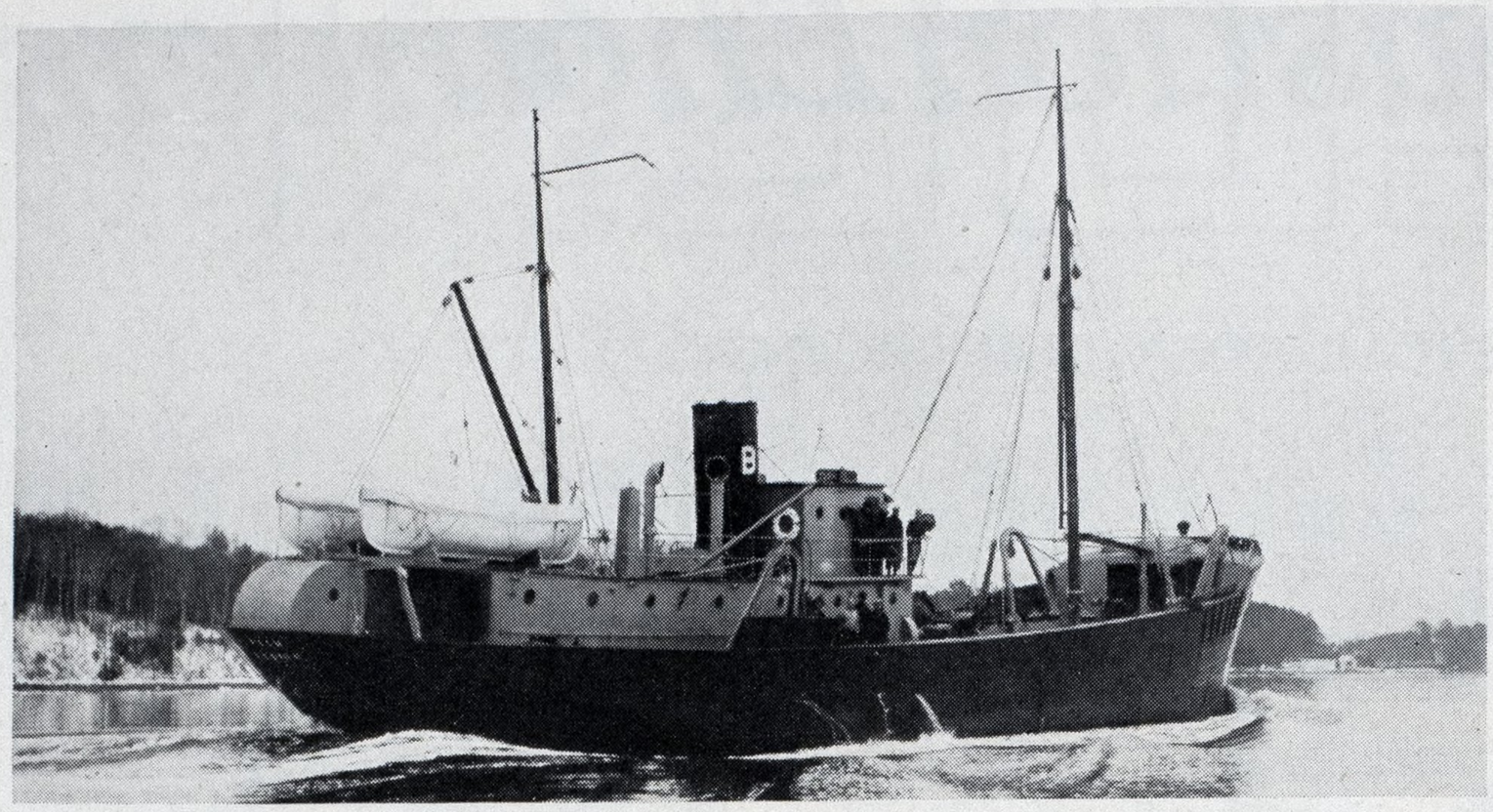
Pumps—Worthington; Kinney; Stillman; Warren
Windlass—Hyde Windlass Co.
Steering Gear—Sun Shipbuilding & Dry Dock Co.; American Engineering Co. and General Electric Co.
Propellers—Crown; Sun Shipbuilding Co.
Refrigeration—Brunswick-Kroeschell Co.
Oil Burning Equipment—Coen Co.
Valves and Fittings—Crane Co.
Electric Motors—General Electric Co.
Contra Rudders—Th. Goldschmidt Corp.
Thrust Bearings—Kingsbury Machine Works
Oil Purifiers—Sharples Specialty Co.
Gyro Compass—Sperry Gyroscope Co.
Rudder Indicator—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Davits—Welin Davit & Boat Corp.

The PACIFIC SUN described and illustrated here is a sister vessel of the SUN and SUNOIL, built within the last two years and the CHESTER SUN only recently completed. There are a number of additional sister vessels under way.

Officers' accommodations are in the 'midship deckhouse; engineers and crew are located aft. The quarters are especially roomy and comfortable with particular care paid to ventilation. Machinery is located aft and the engine room is laid out to give room and accessibility to the various auxiliaries. Cargo pumps are of the duplex type and can handle large cargoes in good time.



EBB AND CLASS—Beam Trawler—Single Screw—Diesel



DESCRIPTION

A number of diesel trawlers of substantial steel construction, single deck, large fish hold forward of midships, and machinery aft have been built within the last two years by the Bath Iron Works Corp. The EBB and FLOW for the Bay State Fishing Co. are identical. They differ from NOTRE DAME and FORDHAM, slightly.

Name—EBB

Owner—Bay State Fishing Co.

Builder—Bath Iron Works Corp.

Naval Architect—Bath Iron Works Corp.

Launched—Nov. 16, '29; completed Nov. 23,

Sister Ships—FLOW, NOTRE DAME and FORDHAM; launched Dec. 2, Dec. 2, 1929 and Jan. 3, 1930; completed Dec. 20, Dec. 10, 1929 and Jan. 8, 1930.

Classification—EBB and FLOW, owner's requirements; NOTRE DAME and FORDHAM, American Bureau of Shipping

HULL PARTICULARS

Length over all, 132 feet 4 inches; length between perpendiculars, 121 feet 7 inches; breadth molded, 24 feet; depth molded, 13 feet; draft, 12 feet; gross tonnage 259.77; net tonnage, 115; cargo capacity, 140 tons of fish and ice; bunker capacity 12,600 gallons diesel fuel; speed, 10.5 knots.

MACHINERY PARTICULARS

Main Engine—One six-cylinder, four-cycle airless injection reversing diesel engine built by Winton Engine Co. Size, 14½ inch bore, 21 inch stroke; 500 brake horsepower at 240 revolutions per minute. Same for trawler FLOW. Trawlers NOTRE DAME and FORDHAM are each fitted with one, six-cylinder, 16-inch bore 20-inch stroke Cooper-Bessemer diesel engine of 500 brake horsepower at 230 revolutions per minute; direct connected at forward end to trawl winch generator and connected to propeller shaft through magnetic clutch built by Cutler-Hammer

Trawl Winch Generator—One General Electric D. C. 80 kilowatts, Winton diesel.

AUXILIARY EQUIPMENT

Pumps—Winton Engine Co.

Trawl Winch—Mead-Morrison Mfg. Co.

Hoist—Mead Morrison Mfg. Co.

Capstan—Hyde Windlass Co.

Auxiliary Generator—One 10 kw., one 20 kw. General Electric, Cummins Engines.

Mechanical Telegraph—Chas. Corey & Sons

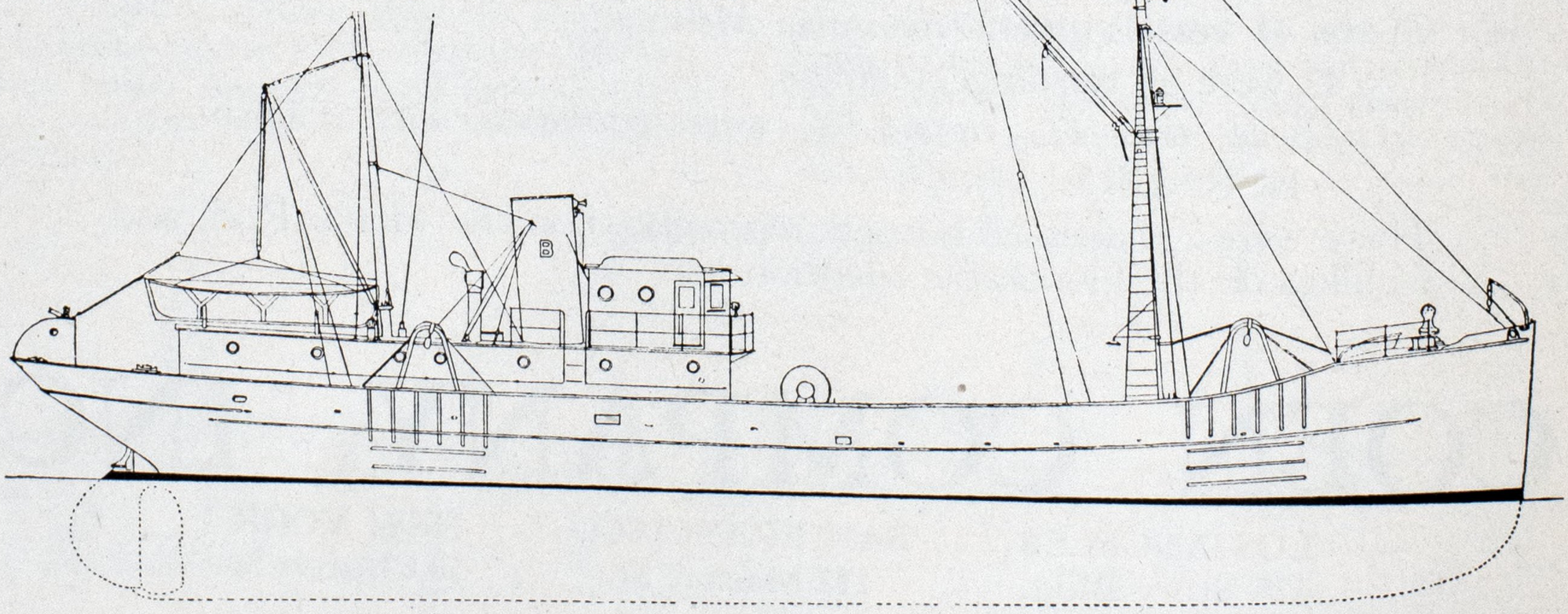
Galley Range—Stamford Foundry Co.

Propeller—H. G. Trout Co.

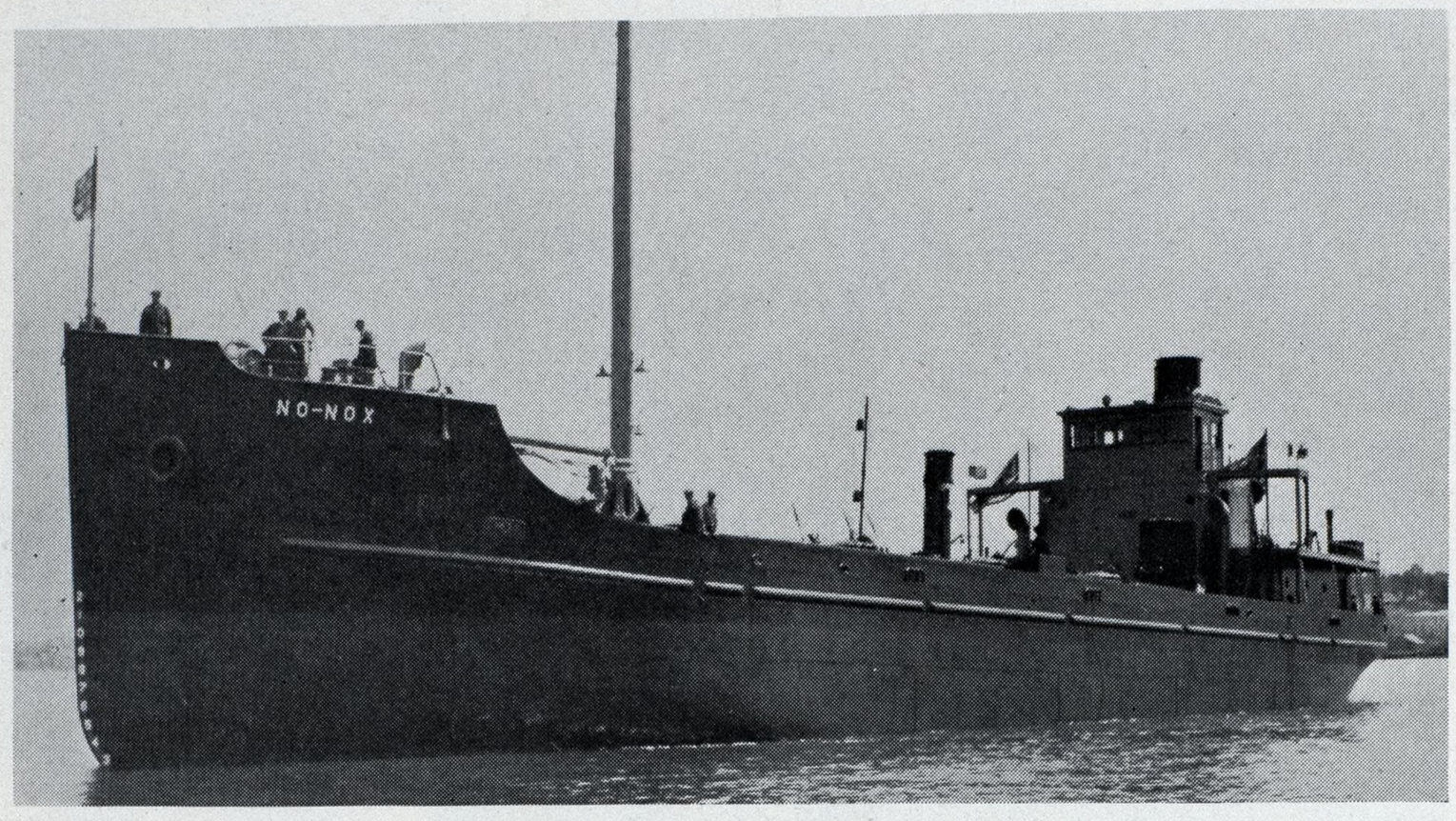
Life Boats—Welin Davit & Boat Corp.

Deck Covering—Selby Battersby Co.

Unless specifically mentioned data given applies only to trawler EBB.



NO-NOX—Tanker—Coastwise—Twin Screw—Diesel



Name—No-Nox
Owner—Gulf Refining Co.
Builder—Fore River Plant—Beth. S. B. Corp.
Naval Architect—Bethlehem S. B. Corp.
Launched—Aug. 7, '29; completed, Aug. 20, '29
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 209 feet, 1½ inches; length between perpendiculars, 200 feet; breadth molded, 14 feet 6 inches; draft, 11 feet 6 inches; displacement loaded, 1911 tons; gross tonnage, 983; net tonnage, 592; cargo capacity, 1263 tons; cargo capacity in cubic feet, 60,-716; bunker fuel capacity, 33 tons of diesel fuel oil; speed, 9¼ gnots.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder 4-cycle diesel engines built by the Standard Motor Construction Co. Diameter of cylinders, 12 inches; stroke, 17 inches; 300 brake horsepower each engine at 300 revolutions per minute.

Auxiliary Generators—Three of 35 kilowatts each; Westinghouse generators driven by Standard diesel engines.

AUXILIARY EQUIPMENT

Manufacturers of:

Pumps—Northern (6); Rumsey (2)
Windlass—Hyde Windlass Co.
Winches—Hyde Windlass Co.
Steering Engine—Hyde Windlass Co.
Propellers—Cramp's
Valves and Fittings—Crane Co.
Marine Hardware—H. S. Getty & Co., Inc.
Lighting Set—Kohler, 2000 watt set
Oil Purifier—Sharples Specialty Co.
Searchlights—Sperry Gyroscope Co.

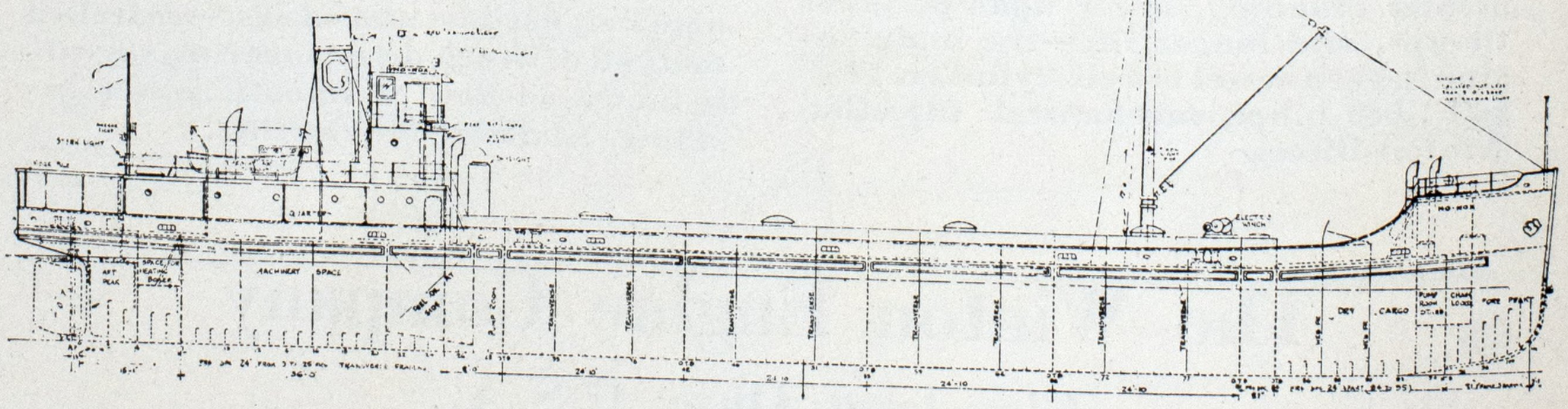
DESCRIPTION

This vessel is a small, fully equipped oil tanker of sufficient size to weather ocean conditions. Its use is for coastwise, harbor and bay service. A speed of 9¼ knots can be maintained. Propulsion is by direct connected diesel engines. The vessel is divided into four main compartments.

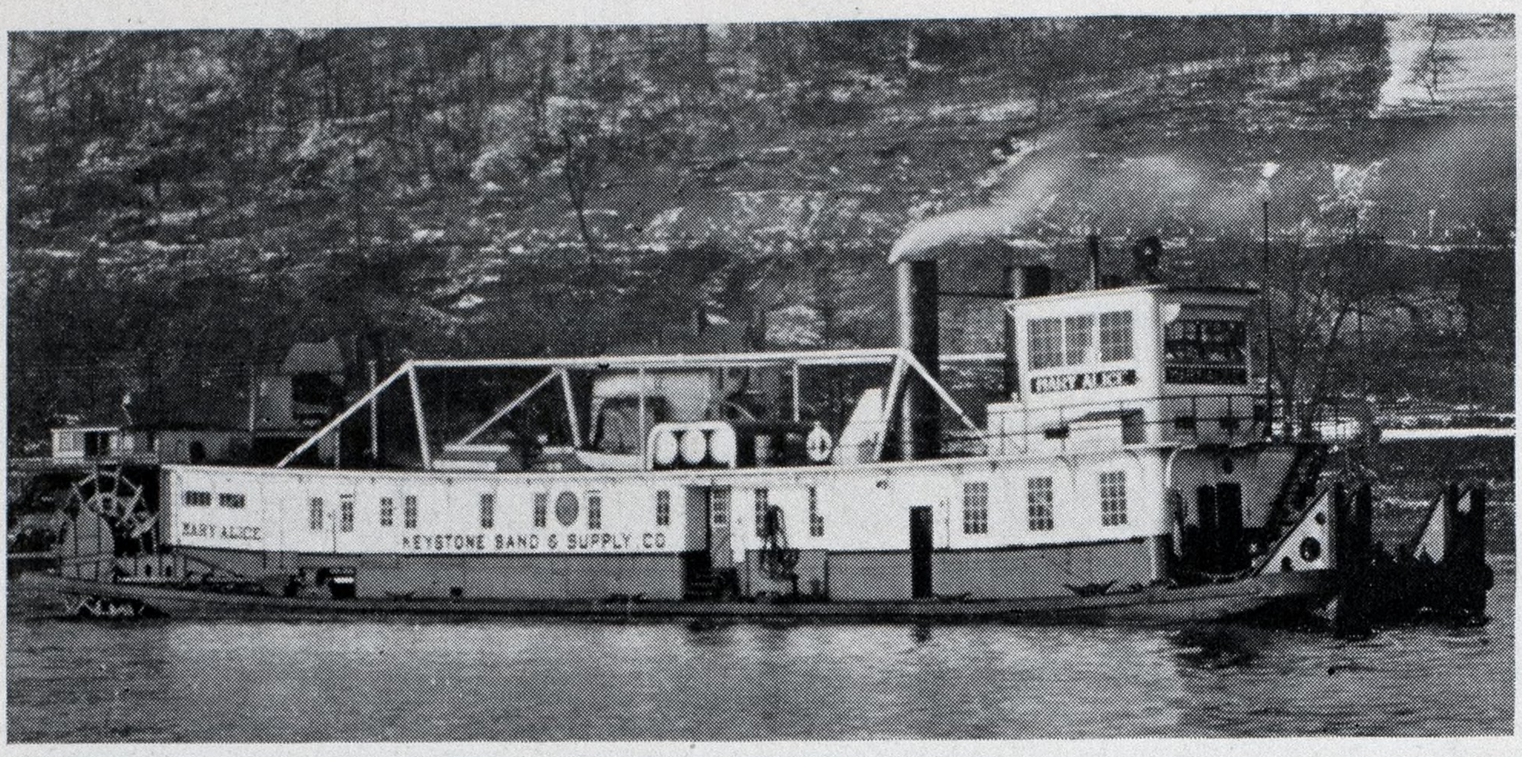
To meet the growing demand for its product the Gulf Refining Co. early in 1929 decided to add to its fleet one or more barges to carry gasoline. Early in February, 1929, specifications for two types of barges were issued and as a result of bids received, one of these vessels, the No-Nox was placed with the Fore River Plant of the Bethlehem Shipbuilding Corp.

The contract stated that the vessel must carry 10,000 barrels of gasoline in addition to fuel, fresh water and stores on a draft of 11 feet 6 inches, and to give a speed of not less than 9¼ knots. These conditions have been successfully met in operation. The No-Nox was completed in five months from date of contract.

She is of the usual single deck type with raised forecastle forward and deck house aft for berthing and messing the crew. Deck covering was supplied by Selby Battersby Co.



MARY ALICE—River Towboat—Stern Wheel—Diesel



Name—MARY ALICE
Owner—Keystone Sand & Supply Co.
Builder—The Dravo Contracting Co.
Naval Architect—The Dravo Contracting Co.
Launched—Oct. 4, '29; completed, Oct. 24, '29
Classification—Owner's Requirements

HULL PARTICULARS

Length over all, 158 feet 7⅞ inches; length between perpendiculars, 134 feet 10 inches; breadth molded, 26 feet 6 inches; depth molded, 5 feet 6 inches; draft, 4 feet 2 inches; displacement loaded, 365 tons of 2000 pounds each; gross tonnage, 214; net tonnage, 203; bunker fuel capacity in tons of oil. 34.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder 4-stroke cycle diesel engines built by the New London Ship & Engine works of the Electric Boat Co.; size, brake horsepower, 300 at 250 revolutions.

Boiler—One, small boiler for heating; coal fired of 20-horsepower rating.

Auxiliary Generator—One, 40 kilowatts diesel engine driven, built by Fairbanks, Morse & Co. This unit is used for supplying power to the capstan motors, for lighting and for charging the two banks of Exide storage batteries.

DESCRIPTION

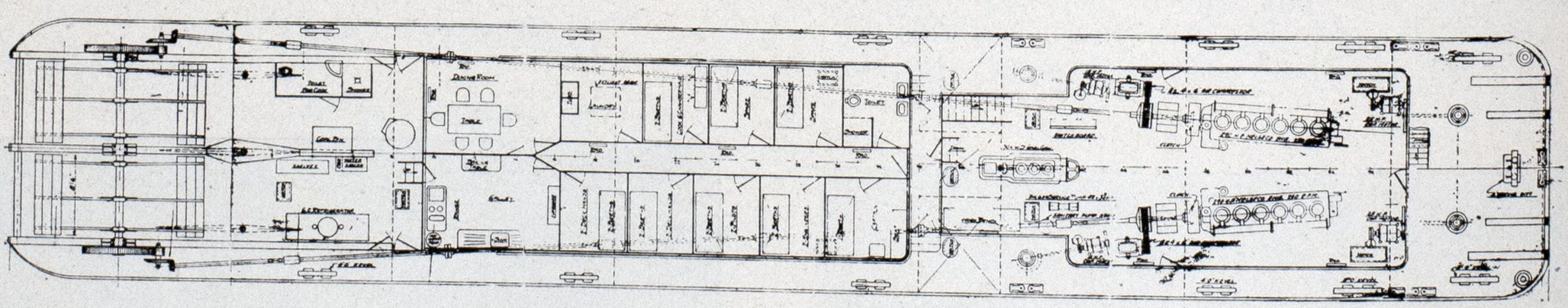
This vessel has an all steel hull, deck house and pilot house. The hull is built with straight sides, flat bottom and scow bow on the transverse system of framing. Propelling power is supplied by two 300-horsepower diesel engines, each connected through shafting and gear to a half section of the split wheel.

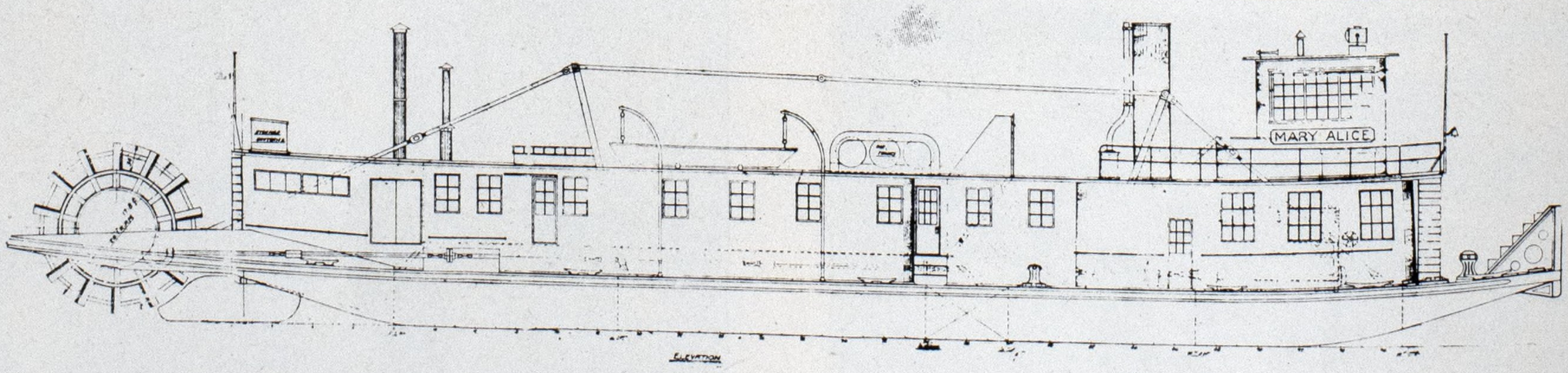
AUXILIARY EQUIPMENT

Pumps—American Steam Pump Co.
Steering Engine—The Dravo Contracting Co.
Refrigeration—Kelvinator and G.E.
Electric Motors—Two forward capstans are driven by 25-horsepower electric motors; one capstan on each side amidships driven by 15-horsepower motors
Air Compressors—Two, Ingersoll-Rand
Batteries—Electric Storage Battery Co.

The split stern wheel design with separate engine for each half makes for unusual flexibility in maneuvering the boat. The stern wheel is made up of fourteen 34-inch buckets and has a diameter of 17 feet 8 inches.

The drive of the MARY ALICE is similar to that of her two sister ships, the BENWOOD and BETTY. The line shafting connected with De Laval flexible couplings runs the length of the boat from the engines to the Dravo patented double geared drive, adjacent to the split stern wheel. There is a hand-operated jaw clutch developed by the Dravo company which makes it possible to disconnect the engine from the line shafting for warming up the engine, testing, or other reasons.





Merchant Vessels Over 100 Tons Under Construction in American Shipyards During 1929

Vessel	Yard	Type	Class	Gross	Owners	Mach.	H.P.	Len. ft. in.	Beam ft. in.	Dep. ft. in.	Fuel	Remarks	Status
Alabama	Amer. Bridge Co.	T. Boat	Rivers	300	Tenn. Coal, Iron & R.R. Co.	Oil Elec.	1100	140 8	25	9 3	Oil	River Towing—Screw	Completed
Amherst	Fore River, Beth. S. B. Co.	Fishing	Coast	164	General Sea Foods Corp.	Oil Eng.	375	110	22	11 6	Oil	Off Shore Fishing	Under con.
Argus	Spedden Shipbuilding Co.	Patrol	Harbor	248	War Department	Recip.	550	121 5½	24	13 3	Oil	Supervisor N. Y. Harbor	Under con.
Berwindglen	Fore River, Beth. S. B. Co.	Collier	Coast	4411	Wilmore S. S. Co.	Recip.	2200	366 6	50	30 3	Coal	Pulverized Coal Burner	Completed
Berwindvale	Fore River, Beth. S. B. Co.	Collier	Coast	4411	Wilmore S. S. Co.	Turb.	2000	366 6	50	30 3	Coal	Pulverized Coal Burner	Completed
Blue Sunoco	Sun S. B. & D. D. Co.	Tanker	Coast	1588	Sun Oil Co.	Oil Eng.	1000	255	43	18 6	Oil	Twin Screw Canal Tanker	Completed
Buckeye State	St. Law. Mar. Repair Co.	Cargo	Canal	1600	Federal Motorship Corp.	Oil Eng.	700	255	43 6	18	Oil	2000 Tons Capacity	Under con.
Carolinian	Char. D.D. & Mach. Co.	Tanker	Harbor	...	M. L. Clark	Oil Eng.	180	123	23	10	Oil	Welded Construction	Under con.
Cayuga Sun	Sun S. B. & D. D. Co.	Tanker	Harbor	499	Sun Oil Co.	Oil Elec.	300	197	31	11 6	Oil	Harbors—Barge Canal	Completed
Champlain	Fore River, Beth. S. B. Co.	Cutter	Ocean	2000*	U. S. Government	Turb. Elec.	3000	250	42	26 10	Oil	U. S. Coast Guard	Completed
Chester Sun	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Motor Tankship Corp.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.
City of Flint 32	Manitowoc S. B. Corp.	Carferry	Lakes	3300	Pere Marquette Railway	Turb. Elec.	7200	381 6	57	22 6	Coal	Twin Screw—Great Lakes	Under con.
City of Hampton	Maryland Dry Dock Co.	Ferry	Harbor	625	Chesapeake Ferry Co.	Oil Eng.	500	157	41	11 6	Oil	Passenger & Auto Ferry	Under con.
City of New York	Sun S. B. & D. D. Co.	P. Car.	Ocean	8272	Amer. S. African Line, Inc.	Oil Eng.	5400	470 8	61 6	37	Oil	Twin Screw Car. & Pass.	Under con.
City of Norfolk	Hampton Roads S. B. Co.	Ferry	Harbor	530	Norfolk County Ferries Co.	Oil Elec.	650	173	57	14	Oil	Norfolk-Portsmouth Ferry	Under con.
City of Saginaw 31	Manitowoc S. B. Corp.	Carferry	Lakes	3327	Pere Marquette Railway	Turb. Elec.	7200	381 6	57	22 6	Coal	Twin Screw—Great Lakes	Completed
Cornell	Fore River, Beth. S. B. Co.	Fishing	Coast	164	General Sea Foods Corp.	Oil Eng.	375	110	22	11 6	Oil	Off Shore Fishing	Under con.
Coronado	Moore Dry Dock Co.	Ferry	Bay	502	San Diego & Cor. Ferry	Oil Elec.	750	190 1	60 1	14 9	Oil	Pass. & Auto Ferry	Completed
C. W. Talbot	Midland Barge Co.	T. Boat	Rivers	416	Union Barge Line Corp.	Recip.	750	176 6	34	6 6	Coal	River Towing-Stern W.	Completed
Dartmouth	Fore River, Beth. S. B. Co.	Fishing	Coast	164	General Sea Foods Corp.	Oil Eng.	375	110	22	11 6	Oil	Off Shore Fishing	Under con.
Delta Standard	Union Plant, Beth. S. B. Co.	Tanker	Bay	111	Standard Oil Co. of Cal.	Gas	250	101 4	22	5 3	Gas	Shallow Bay Service	Completed
De Voe & Harold	United Dry Docks, Inc.	T. Boat	Harbors	260	Balt. & Ohio Railroad	Recip.	850	118 6	25	13 6	Coal	Shifting & Towing Floats	Under con.
Dongan Hills	Staten Island S. B. Co.	Ferry	Harbor	2097	City of New York	Recip.	4000	267	46	19 9	Oil	Municipal Ferry Service	Completed
Dorchester	Fore River, Beth. S. B. Co.	Trawler	Ocean	164	R. O'Brien & Co.	Oil Eng.	350	110	22	11 6	Oil	Off Shore Fishing	Completed
Du Bois II	United Dry Docks, Inc.	Tug	Harbors	235	Henry Du Bois Sons Co.	Recip.	950	128	27	14	Oil	Harbor Towing	Under con.
Dwight F. Davis	Charles Ward Eng. Wks.	T. Boat	Rivers	311	Inland Waterways Corp.	Recip.	1000	140	25	9	Coal	Screw (pulverized coal)	Completed
Ebb	Bath Iron Works	Fishing	Ocean	256	Bay State Fishing Co.	Oil Eng.	550	132 4	24	13	Oil	Off Shore Trawler	Completed
Eleu	Union Plant, Beth. S. B. Co.	Tug	Ocean	335	Inter-Island St. Nav. Co.	Oil Eng.	1120	125	28	16	Oil	Hawaiian Islands	Completed
Empire State	St. Law. Mar. Repair Co.	Cargo	Canal	1692	Federal Motorship Corp.	Oil Eng.	600	255	43 6	20	Oil	Lakes and Barge Canal	Completed
Eugene P. Thomas	Great Lakes Eng. Works	Cargo	Lakes	7860	Pittsburgh Steamship Co.	Recip.	2200	604	60	32	Coal	Bulk Freighter—Great Lakes	Under con.
Excalibur	New York S. B. Co.	Pass.	Ocean	8700	Export Steamship Corp.	Turbine	8000	475 1	61 6	42 3	Oil	New York-Mediterranean	Under con.
Exochorda	New York S. B. Co.	Pass.	Ocean	8700	Export Steamship Corp.	Turbine	8000	475 1	61 6	42 3	Oil	New York-Mediterranean	Under con.
Flow	Bath Iron Works	Fishing	Ocean	256	Bay State Fishing Co.	Oil Eng.	550	132 4	24	13	Oil	Off Shore Trawler	Completed
Fordham	Bath Iron Works	Fishing	Coast	256	A. & P. Fish Co.	Oil Eng.	550	132 4	24	13	Oil	Ocean Trawler	Completed
Flying Cloud	Delano Brusstar	Fishing	Coast	236	Ocean Industries Co.	Oil Eng.	360	104	25 3	12	Oil	Ocean Trawler	Completed
General Humphreys	Chas. Ward Eng. Wks.	Inspec.	Rivers	103	U. S. Engineers	Oil Eng.	250	85	18	7	Oil	For River Inspection	Completed
Glory of the Sea	Delano Brusstar	Fishing	Coast	236	Manuel Correia	Oil Eng.	400	104	25 3	12	Oil	Ocean Trawler	Completed
Harry F. Sinclair, Jr.	Fore River, Beth. S. B. Co.	Tanker	Ocean	6700	Sinclair Navigation Co.	Turbine	4000	435	57	32	Oil	Oil Tanker—Ocean Service	Under con.
Horace Johnson	American S. B. Co.	Cargo	Lakes	7897	Pittsburgh Steamship Co.	Recip.	2400	604 9	60	32	Coal	Bulk Freighter—Great Lakes	Completed
Hualalai	Union Plant, Beth. S. B. Co.	Pass.	Coast	3092	Inter-Island St. Nav. Co.	Turbine	4000	310 10	48	27 6	Oil	Hawaiian Islands	Completed
Hull No. 8	Electric Boat Co.	Tug	Harbor	140	Electric Boat Co.	Oil Eng.	500	88 9	21 6	11 3	Oil	General Towing	Under con.
Hull No. 55	Los Angeles S.B. & D.D. Co.	Fishing	Coast	210	...	Oil Eng.	400	107	25	11 6	Oil	Ocean Trawler	Completed
Hull No. 113	Federal S. B. & D. D. Co.	Tanker	Ocean	12000	Standard Shipping Co.	Turbine	8000	544	74	40 6	Oil	Tanker Ocean Service	Under con.
Hull No. 114	Federal S. B. & D. D. Co.	Tanker	Ocean	12000	Standard Shipping Co.	Turbine	8000	544	74	40 6	Oil	Tanker Ocean Service	Under con.
Hull No. 117	Federal S. B. Co.	Tanker	Harbor	650	United Pet. Trans. Co.	Oil Eng.	360	160	28	12	Oil	Self-Propelled Oil Barge	Under con.
Hull No. 123	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Motor Tankship Corp.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.
Hull No. 124	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Motor Tankship Corp.	Oil Eng.	2800	498	65 9	37	Oil	Bulk Oil Carrier—Ocean	Under con.
Hull No. 125	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Tidewater Oil Co.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.
Hull No. 126	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Tidewater Oil Co.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.
Hull No. 127	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Standard Transp. Co.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.
Hull No. 128	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Standard Transp. Co.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.

Hull No. 129	Sun S. B. & D. D. Co.	Tanker	Harbor	600	Sun Oil Co.	Oil Eng.	300	188 6	31	11 6	Oil	Short Coastwise	Under con.
Hull No. 130	Sun S. B. & D. D. Co.	Tanker	Harbor	600	Sun Oil Co.	Oil Eng.	300	188 6	31	11 6	Oil	Short Coastwise	Under con.
Hull No. 131	Sun S. B. & D. D. Co.	Tanker	Ocean	9000	Motor Tankship Corp.	Oil Eng.	2800	498	65 9	37	Oil	Oil Tanker—Ocean Service	Under con.
Hull No. 183	Toledo Shipbldg. Co.	C. Ferry	Lakes	3000	Wabash Railway	Recip.	2500	370	65	21 6	Coal	Detroit River Carferry	Under con.
Hull No. 254	Manitowoc S. B. Corp.	Tanker	Lakes	4500	Standard Oil Co. (Ind.)	Recip.	2500	400 5	53 3	27	Oil	Tanker—Great Lakes	Under con.
Hull 267	Spedden Shipbldg. Co.	Tug	Harbor	160	Oil Transfer Corp.	Oil Eng.	...	....	....	....	Oil		Completed
Hull No. 339	Newport News S. B. Co.	Pass.	Ocean	21900	Dollar Steamship Lines	Turb. Elec.	26500	654 3	81	52	Oil	Twin Screw—World Service	Under con.
Hull No. 340	Newport News S. B. Co.	Pass.	Ocean	21900	Dollar Steamship Lines	Turb. Elec.	26500	654 3	81	52	Oil	Twin Screw—World Service	Under con.
Hull No. 396	New York S. B. Co.	Pass.	Ocean	8700	Export Steamship Corp.	Turb.	8000	475 1	61 6	42 3	Oil	N. Y.-Mediterranean	Contract placed
Hull No. 397	New York S. B. Co.	Pass.	Ocean	8700	Export Steamship Corp.	Turb.	8000	475 1	61 6	42 3	Oil	N. Y.-Mediterranean	Contract placed
Hull No. 1432	Fore River, Beth. S. B. Co.	Pass.	Ocean	7000	N. Y. & Porto Rico S.S. Co.	Turb.	6400	429	59 6	35	Oil	N. Y.-Porto Rico San Dom.	Under con.
Hull No. 1436	Fore River, Beth. S. B. Co.	Tanker	Sound	800	Lake Tankers Corp.	Oil Elec.	500	201 7	32	11 6	Oil	Tanker-Barge Canal	Under con.
Hull No. 1437	Fore River, Beth. S. B. Co.	Tanker	Sound	800	Lake Tankers Corp.	Oil Elec.	500	201 7	32	11 6	Oil	Tanker—Barge Canal	Under con.
Hull No. 1440	Fore River, Beth. S. B. Co.	Pass.	Ocean	17500	Matson Oceanic S.S. Co.	Turb.	22000	631 6	79	52 9	Oil	Twin Screw, 20½ knots	Under con.
Hull No. 1441	Fore River, Beth. S. B. Co.	Pass.	Ocean	17500	Matson Oceanic S.S. Co.	Turb.	22000	631 6	79	52 9	Oil	Twin Screw, 20½ Knots	Under con.
Hull No. 1442	Fore River, Beth. S. B. Co.	Tanker	Sound	800	Lake Tankers Corp.	Oil Elec.	500	201 7	32	11 6	Oil	Tanker—Barge Canal	Under con.
Hull No. 1678	Howard Shipyards Co.	T. Boat	Rivers	509	Vesta Coal Co.	Oil Eng.	700	...	...	...	Oil	River Towing—Screw	Under con.
Hull No. 1679	Howard Shipyards Co.	T. Boat	Rivers	509	Vesta Coal Co.	Oil Eng.	700	...	...	...	Oil	River Towing—Screw	Under con.
Humuula	Union Plant, Beth. S. B. Co.	Pass.	Coast	961	Inter-Island St. Nav. Co.	Turb.	1850	217 3	38	17	Oil	Hawaiian Islands	Completed
Hydrographer	Spear Engineers Inc.	Survey	Coast	470	C. & Geodetic Survey	Oil Elec.	650	167 5	31 6	19 6	Oil	Atlantic Coast Survey	Completed
Indiana	Charles Ward Eng. Wks.	T. Boat	Rivers	750	Miss. Valley Barge Line	Turb. Elec.	2000	200	40	10 6	Oil	River Towing	Under con.
Itasca	General Engineering Co.	Cutter	Ocean	2000*	U. S. Coast Guard	Turb. Elec.	3220	250	42	26 10	Oil	Similar to Chelan	Under con.
J. D. Ayres	Midland Barge Co.	T. Boat	Rivers	416	Union Barge Line Corp.	Recip.	750	176 6	34	6 6	Coal	River Towing—Stern W.	Completed
John Kendall	Toledo Shipbuilding Co.	Fire Bt.	Harbor	347	City of Detroit	Recip.	1000	135	29	15 6	Oil	Fire Protec., Ice break.	Completed
John M. Dennis	Spear Engineers Inc.	Ferry	Bay	889	Claiborne-Annap. Fer. Co.	Oil Eng.	1680	220	60	14 6	Oil	Claiborne-Annap. Md.	Completed
Las Cruces	Ellicott Machine Corp.	Dredge	Harbors	...	Panama Canal	Oil Elec.	3600	226	50	14	Oil	Canal Zone Operation	Completed
Leo B. Bisso	Nashville Bridge Co.	Ferry	Rivers	257	Bisso Ferry Co.	Recip.	500	...	...	..	Coal	Catamaran Ferry N. Orleans	Completed
Lightning	Delano Brusstar	Fishing	Coast	236	Matsuuki Sugiyama et al	Oil Eng.	400	104	25 3	12	Oil	Ocean Trawler	Completed
Lightship No. 100	Albina Marine Iron Wks.	L. Ship	Coast	675*	U. S. Bureau Lighthouses	Oil Elec.	350	133 3	30	15	Oil	Off Shore Lightships	Completed
Lightship No. 113	Albina Marine Iron Wks.	L. Ship	Coast	675*	U. S. Bureau Lighthouses	Oil Elec.	350	133 3	30	15	Oil	Off Shore Lightships	Under con.
Lightship No. 114	Albina Marine Iron Wks.	L. Ship	Coast	675*	U. S. Bureau Lighthouses	Oil Elec.	350	133 3	30	15	Oil	Off Shore Lightships	Under con.
Lightship No. 115	Charleston D.D. & Ma. Co.	L. Ship	Coast	675*	U. S. Bureau Lighthouses	Oil Elec.	350	133 3	30	15	Oil	Four generating sets	Under con.
Lightship No. 116	Charleston D.D. & Ma. Co.	L. Ship	Coast	675*	U. S. Bureau Lighthouses	Oil Elec.	350	133 3	30	15	Oil	Four generating sets	Under con.
Lightship No. 117	Charleston D.D. & Ma. Co.	L. Ship	Coast	675*	U. S. Bureau Lighthouses	Oil Elec.	350	133 3	30	15	Oil	Four generating sets	Under con.
Liston	Charleston D.D. & Ma. Co.	Survey	Harbor	330	U. S. Engineers (Phila.)	Oil Elec.	500	105 4	22	8 3	Oil	Harbor Survey Work	Under con.
L. I. R. R. No. 1	Pusey & Jones	Tug	Harbor	258	Pennsylvania Railroad	Oil Elec.	750	105	24	14	Oil	Harbor Towing	Under con.
Loretta Howard	Howard Ship Yds. & D. Co.	T. Boat	Rivers	...	Howard S. Y. & D. Co.	Recip.	1200	169	30	6	Coal	River Towing	Completed
Louisiana	Charles Ward Eng. Wks.	T. Boat	Rivers	750	Miss. Valley Barge Line	Turb. Elec.	2000	200	40	10 6	Oil	River Towing	Under con.
Mary Alice	Dravo Contracting Co.	T. Boat	Rivers	268	Keystone Sand & Supply Co.	Oil Eng.	600	158 8	26 6	5 6	Oil	River Towing	Completed
Material Service	L. D. Smith Dock Co.	Unloader	Lakes	1077	L. D. Smith-Put. Nav. Co.	Oil Eng.	700	246	40	15	Oil	Lakes-River Service	Completed
Melrose	Todd D. D. & Rep. Co.	Ferry	Harbor	593	City of New York	Recip.	650	151	53	14 3	Oil	Pass. Ferry East River	Completed
Mendota	Fore River, Beth. S. B. Co.	Cutter	Ocean	2000*	U. S. Government	Turb. Elec.	3000	250	42	26 10	Oil	U. S. Coast Guard	Completed
Morro Castle	Newport News S. B. Co.	Pass.	Ocean	11300	Atlantic, Gulf & W. I. Co.	Turb. Elec.	16000	508	70 9	39	Oil	Twin Screw, 20 Knots	Under con.
Myron C. Taylor	Great Lakes Eng. Works	Cargo	Lakes	7945	Pittsburgh Steamship Co.	Recip.	2200	604	60	32	Coal	Bulk Freighter—Great Lakes	Completed
Naushon	Fore River, Beth. S. B. Co.	Pass.	Sound	1979	New England S. S. Co.	Recip.	2400	250 10	45	16	Coal	New Bedford-Nantucket	Completed
N. Y. Central No. 35	United Dry Docks Co.	Cargo	Harbor	150	New York Central	Oil Eng.	600	122	32 6	14 6	Oil	Harbor Work	Under con.
No-Nox	Fore River, Beth. S. B. Co.	Tanker	Coast	983	Gulf Refining Co.	Oil Eng.	600	209 1½	38	14 6	Oil	Speed 9¼ knots	Completed
Northland	Lake Washington Shipyards	P. Cargo	Coast	1255	Northland Transp. Co.	Oil Eng.	1120	186	35	21 6	Oil	Seattle to Ketchikan	Completed
Notre Dame	Bath Iron Works	Fishing	Coast	256	A. & P. Fish Co.	Oil Eng.	550	132 4	24	13	Oil	Ocean Trawler	Completed
Ohio	Dravo Contracting Co.	T. Boat	Rivers	1253	Standard Unit Nav. Co	Recip.	2000	200	40	10 6	Oil	River Towing	Under con.
Oriente	Newport News S. B. Co.	Pass.	Ocean	11300	Atlantic, Gulf & W. I. Co.	Turb. Elec.	16000	508	70 9	39	Oil	Twin Screw, 20 knots	Under con.
Pacific Sun	Sun S. B. & D. D. Co.	Tanker	Ocean	9086	Motor Tankship Corp.	Oil Eng.	2800	498	65 9	37	Oil	Bulk Transport of Oil	Completed
Pennsylvania	Newport News S. B. Co.	Pass.	Ocean	20526	American Line S. S. Corp.	Turb. Elec.	17000	613 1¼	80	52	Oil	N. Y.-Panama-Pacific	Completed
Peru	Federal S. B. & D. D. Co.	Dredge	Harbor	600	Gahagan Cons. Corp.	Turb.	1500	166	40	13 6	Oil	Hyd.-Harbor Improve.	Completed
Pittsburgh	United Dry Docks, Inc.	Dredge	Harbor	650	Atlantic Gulf & Pacific Co.	Turb.	850	162	44	15	Oil	Dredging	Completed

Note * Displacement in tons. Gross tonnage not available.

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Merchant Vessels Over 100 Tons Under Construction in American Shipyards During 1929

(*Continued from Page 81*)

Vessel	Yard	Type	Class	Gross	Owners	Mach.	H.P.	Len. ft. in.	Beam ft. in.	Dep. ft. in.	Fuel	Remarks	Status
P. R. R. No. 17	Pusey & Jones	Tug	Harbor	258	Pennsylvania Railroad	Oil Elec.	750	105	24	14	Oil	Harbor Towing	Under con.
Quincy	Fore River, Beth. S. B. Co.	Trawler	Ocean	164	R. O'Brien & Co.	Oil Eng.	350	110	22	11 6	Oil	Off Shore Fishing	Completed
R. W. Holst	Toledo S. B. Co.	Cargo	Lakes	184	Holst Builders Supply	Oil Eng.	200	116	28	6 6	Oil	Sand & Gravel Trade	Completed
Sam Craig	Midland Barge Co.	T. Boat	Rivers	416	Union Barge Line Corp.	Recip.	750	176 6	34	6 6	Coal	River Towing-Stern W.	Completed
San Diego	Moore Shipbldg. Co.	Ferry	Harbor	1800	San Diego & Coro. Fer. Co.	Oil Elec.	1000	251	46 3	19 3	Oil	Pass. & Auto Ferry	Completed
Santa Clara	New York S. B. Co.	Pass.	Ocean	9500	Grace Line Inc.	Turb. Elec.	12000	505 ½	63 9	37 3	Oil	Twin Screw Pass. & Cargo	Under con.
Saranac	General Engineering Co.	Cutter	Ocean	2000*	U. S. Coast Guard	Turb. Elec.	3220	250	42	26 10	Oil	Similar to Chelan	Under con.
Seaboard No. 1	Fore River, Beth. S. B. Co.	Tanker	Harbor	442	Seaboard Shipping Corp.	Oil Eng.	250	165 8	33	10 6	Oil	Passaic River	Completed
Sebago	General Engineering Co.	Cutter	Ocean	2000*	U. S. Coast Guard.	Turb. Elec.	3220	250	42	26 10	Oil	Similar to Chelan	Under con.
Seneca Sun	Sun S. B. & D. D. Co.	Tanker	Harbor	499	Sun Oil Co.	Oil Elec.	300	197	31	11 6	Oil	Harbors-Barge Canal	Completed
Shoshone	General Engineering Co.	Cutter	Ocean	2000*	U. S. Coast Guard	Turb. Elec.	3220	250	42	26 10	Oil	Similar to Chelan	Contract placed
Socony 23	United Dry Docks, Inc.	T. Boat	Harbor	166	Standard Transp. Co.	Recip.	550	97	22	10 9	Oil	Harbor Towing	Completed
Socony 27	United Dry Docks, Inc.	T. Boat	Harbor	166	Standard Transp. Co.	Recip.	550	97	22	10 9	Oil	Harbor Towing	Completed
Tacoma Fireboat No. 1.	Coastline Shipbldg. Co.	Fire Bt.	Harbor	120	City of Tacoma	Gas	425	96b.p.	20	9	Gas	Harbor Fire Protection	Completed
Tenkenas	New London S. & E. Co.	Ferry	Harbor	447	State of New York	Oil Elec.	500	115 6	38	14	Oil	East River New York	Completed
Tennessee	Dravo Contracting Co.	T. Boat	Rivers	1253	Standard Unit Nav. Co.	Recip.	2000	200	40	10 6	Oil	River Towing	Under con.
Tennessee	Marietta Mfg. Co.	T. Boat	Rivers	250*	U. S. Engineers	Oil Elec.	300	161	29	4 6	Oil	River Towing	Under con.
Thomas W. Lamont	Toledo Shipbldg. Co.	Cargo	Lakes	7964	Pittsburgh Steamship Co.	Recip.	2500	604	60	32	Coal	Bulk Freighter—Great Lakes	Under con.
Tidemotor	Sun S. B. & D. D. Co	Tanker	Harbor	531	Tidewater Oil Co.	Oil Elec.	300	197	31	11 6	Oil	Harbor—Barge Canal	Completed
Tidewater	Pusey & Jones	Tanker	Coast	1815	Tidewater Oil Co.	Oil Elec.	1000	267	44	18 6	Oil	Single Screw—Bulk Oil	Completed
Tomkinsville	United D.D. S.I.S.B. Plant	Ferry	Harbor	2000	City of New York	Recip.	4000	267	46	19 9	Oil	New York Harbor Service	Under con.
Tom Stallings	Charles Ward Eng. Wks.	Snag Bt.	Rivers	165	U. S. Engineers	Recip.	160	127	30	4 4	Coal	30-ton River Snag Boat	Completed
Unknown	Nashville Bridge Co.	Dredge	Rivers	300	Central Sand & Gravel Co.	Oil Eng.	240	150	36	6	Oil	Mississippi River Service	Under con.
Unknown	Nashville Bridge Co.	Dredge	Rivers	200	McWilliams Dredging Co.	Oil Eng.	835	134 6	30	8	Oil	Mississippi River Service	Under con.
Unknown	Dubuque Boat & Boiler Co.	T. Boat	Rivers	700	Inland Waterways Corp.	Recip.	1000	160	42	6	Oil	Upper Mississippi Div.	Under con.
Unknown	Dubuque Boat & Boiler Co.	T. Boat	Rivers	700	Inland Waterways Corp.	Recip.	1000	160	42	6	Oil	Upper Mississippi Div.	Under con.
Van Dyke IV	Kensington Shipyard	T. Boat	Harbor	175	Atlantic Refining Co.	Oil Elec.	425	98 4	21	11 6	Oil	Harbor Service	Under con.
Veedol No. 2	Pusey & Jones	Tanker	Coast	1815	Tidewater Oil Co.	Oil Elec.	1000	266 6	44	18 6	Oil	Single Screw—Bulk Oil	Under con.
Violet	Manitowoc S. B. Corp.	Tender	Ocean	770*	U. S. Bureau Lighthouses	Recip.	800	170	32	13	Oil	Twin Screw Lighthouse Tender	Under con.
Virginia Sinclair	Fore River, Beth. S. B. Co.	Tanker	Ocean	6700	Sinclair Navigation Co.	Turb.	4000	435	57	32	Oil	Oil Tanker—Ocean Service	Under con.
Walter A. Windsor	Marietta Mfg. Co.	T. Boat	Rivers	500	Burnside Barge Line	Recip.	1000	190	36	6 6	Coal	River Towing	Under con.
Ward's Island	New London S. & E. Co.	Ferry	Harbor	447	State of New York	Oil Elec.	500	115 6	38	14	Oil	East River New York	Completed
Warrior	Amer. Bridge Co.	T. Boat	Rivers	300	Tenn. Coal, Iron & R.R. Co.	Oil Elec.	1100	140 8	25	9 3	Oil	River Towing Screw	Completed
Wm. G. Clyde	American S. B. Co.	Cargo	Lakes	7897	Pittsburgh Steamship Co.	Recip.	2400	604 9	60	32	Coal	Bulk Freighter—Great Lakes	Completed
William J. Dickey	United Dry Docks, Inc.	Tugboat	Harbors	260	Balt. & Ohio Railroad	Recip.	850	118 6	25	13 6	Coal	Shifting & Towing Floats	Under con.
William Dickinson	Marietta Mfg. Co.	T. Boat	River	275	Marquette Cement Co.	Oil Eng.	700	125	26	7	Oil	Tunnel Screw Type	Under con.
W. W. Fischer	Nashville Bridge	T. Boat	Rivers	240	Central Sand & Gravel Co.	Oil Eng.	720	121 6	26	8	Oil	River Towing	Completed
Winthrop	Fore River, Beth. S. B. Co.	Trawler	Ocean	164	R. O'Brien & Co.	Oil Eng.	350	110	22	11 6	Oil	Off Shore Fishing	Completed
Yorkville	Todd D.D. & Rep. Co.	Ferry	Harbor	593	City of New York	Recip.	650	151	53	14 3	Oil	Passenger Ferry East River	Completed

Note * Displacement in tons. Gross tonnage not available.

Liner Santa Clara

Makes High Speed

Attains Maximum of 22 Knots on Sea Trials—To Enter Service New York to Callao and Valparaiso April 19



New Grace Line Twin Screw Turbine Electric Liner Santa Clara Leaving the New York Shipbuilding Co. for Her Sea Trials off the Delaware Capes, March 1, 1930

ATTAINING a maximum speed of 22 knots in trial runs off the Delaware capes on March 1 and 2, the new turbine electric Grace liner, SANTA CLARA, which will clip five days from the New York-Valparaiso run, has established herself as about the fastest steamship ever built in America for foreign trade. It is possible that the two Cramp built liners GREAT NORTHERN and NORTHERN PACIFIC at their peak of performance equaled this speed.

In fourteen tests the magnificent vessel made an average speed of 19.58 knots, and in six thrilling sprints in the open sea startled technical observers aboard by logging 22 knots.

Building Up a Merchant Marine

The first passenger ship built under the Jones-White merchant marine act of 1928, the SANTA CLARA represents the government's first move for the definite and systematic rehabilitation of the American merchant marine under private American ownership and will carry the American flag to South American ports in an unexcelled speed schedule. The Jones-White act provides that the government loan to the private owner three-fourths of the cost price of vessels built under its provisions at a low rate of interest. In the case of the SANTA CLARA the total cost was $3,500,000, eighty-two per cent being charged to labor. Built in the port of Philadelphia by the New York Shipbuilding Co. her equipment was assembled from 32 states in the Union. Her entry into South American service is an important step in the furtherance of Pan-American trade, according to officials of the Grace line.

In a statement made by Daulton Mann, executive vice president of the Grace line, before the big ship was warped out, the marine act of 1928 was praised as furthering the development of the American merchant marine and the SANTA CLARA'S intended service was emphasized as bringing the United States and South America closer together and as fostering the further development of mutual understanding and sympathy. He said in part:

"The Grace liner SANTA CLARA today started on its trial trip from the yards of the New York Shipbuilding Co. at Camden, N. J. and will be the fastest passenger liner in service to the west coast of South America. With its maiden voyage from New York, April 19, a business man, or tourist, will be able to reach Peru in nine days, and Valparaiso, Chile, in less than sixteen days.

"It means more than this. It means that the American merchant marine is on its way to renewed development and prestige through the assistance rendered American shipping by the merchant marine act of 1928 and the S. S. SANTA CLARA is the first passenger liner in foreign trade built under this legislation."

The SANTA CLARA is 505 feet ½-inch in length over all, has a beam of 63 feet 9 inches, a displacement of 14,567 tons, a gross register tonnage of 9500, and a depth of 37 feet 3 inches from upper deck to keel. For a summary of principal particulars see page 23. Her luxuriously furnished staterooms, all of which are outside rooms, provide accommodations for 208 first-class passengers and her big cargo holds have a capacity of 6900 tons. Slightly faster than the motorships SANTA MARIA and SANTA BARBARA, she will have a maintained sea speed of 18 knots.

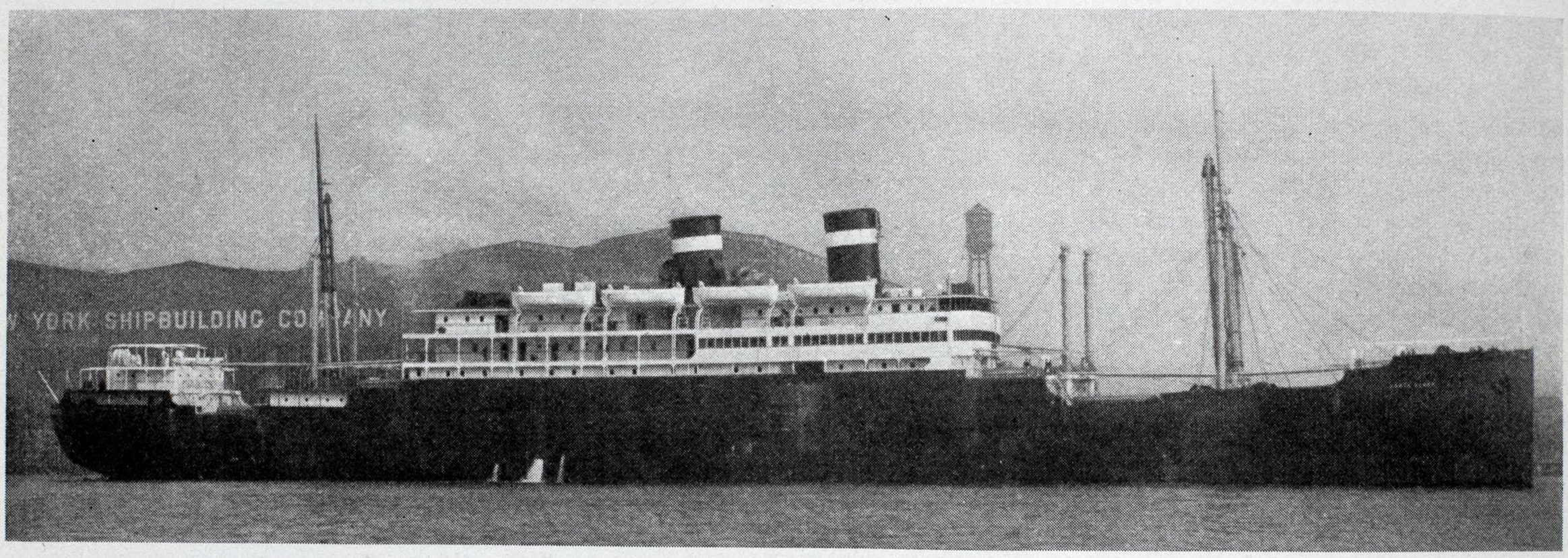
For West Coast South America

The SANTA CLARA has been especially designed for the west coast of South America trade, flies the United States flag, was built in one of the finest shipyards in the United States, and is powered with American machinery. With the SANTA BARBARA and the SANTA MARIA, built abroad and recently added to the Grace line South American service, she will make a trio of American liners of the latest kind, adding much to the prestige of the American merchant marine. The SANTA CLARA may be regarded as a natural product of the constantly growing trade and travel between the

United States and the west coast of South America via the Panama canal.

In size and arrangements, the SANTA CLARA'S public rooms are similar to those of the SANTA MARIA and SANTA BARBARA, the chief difference being in the interior decoration, coloring and furnishings. An article at the time of the launching in the December issue of MARINE REVIEW gives more details.

The commodious staterooms of the SANTA CLARA have been especially designed for the ship's passage through tropical latitudes and cool west coast South American weather, and for the comfort and privacy of her passengers. As already stated, every room is an outside one, some having connecting



Twin Screw Turbine Electrical Liner Santa Clara Anchored in the Delaware River off the Yard of Her Builder, the New York Shipbuilding Co.—Taken About the Time of Her Sea Trials, March 1, 1930

sitting rooms. There are numerous private baths and suites de luxe and also a number of single rooms with shower baths and toilet.

The power plant of the SANTA CLARA consists of six oil-fired Babcock & Wilcox watertube boilers, and two 4800-kilowatt, 3-phase, 3000-volt, General Electric alternating current generators, each driven by a 3000 revolution per minute steam turbine, supplying electric current to two 6300 horsepower synchronous induction motors driving the two propellers.

The propulsion machinery is controlled by electric equipment located on a conveniently arranged platform in the engine room. Three levers control the speed and reversing of each motor. The propulsion motors are used as strict induction type machines when reversing, the usual practice. Under all running conditions the motors will be strictly synchronous machines. The apparatus is designed to give the successful maneuvering features under all conditions of operation and in addition, will give the highest economical efficiencies when under way.

In normal operation, the ship requires the use of five of its six boilers, uses all of its main propulsion equipment and two of its four auxiliary generating plants. While in port one boiler will supply steam to a single auxiliary generating plant, which will give power for lights and auxiliaries.

Electrical Auxiliary Equipment

Practically all of the auxiliary equipment is electrically operated involving approximately 950-horsepower in electric motors. These auxiliaries include devices for the safety, comfort and convenience of passengers and crew, such as steering gear, capstans, electric cooking equipment, deck cargo handling gear, boat handling equipment and warping winches. Power for these auxiliaries is supplied by four 350-kilowatt, 240-volt turbine generators, the turbines being driven by steam from the same boilers used to supply steam for the main propulsion turbines.

Provision is made so that the ship can make long cruises at reduced speed, when only one main propulsion generating set will be needed to drive the two propulsion motors. At any time in regular service any one generating unit or propulsion motor may be shut down for repairs or other purposes, allowing the ship to proceed under power provided by the remaining equipment.

A refrigerating plant with motor-driven brine circulating pumps, supplies refrigeration to 9000 cubic feet of cool air space and 6000 cubic feet of frozen cargo space.

The SANTA CLARA is equipped with the latest devices for safety at sea, including the latest Sperry navigation devices, such as the well known gyropilot, bearing repeaters and automatic steering control of the two unit type. She also carries two highly efficient Sperry searchlights.

On her maiden voyage on April 19, the SANTA CLARA will carry a group of leading American industrialists and tourists who will follow in the footsteps of President Hoover in Central and South America. Col. Clarence Chamberlin will also be a passenger and will take with him his new Crescent cabin monoplane for demonstration throughout South America.

The merchant marine act of 1928 is intended to protect United States commerce against exhorbitant and discriminatory charges, to assure a market throughout the world for the products of our farms and factories, and to be prepared for the emergency of war among other nations. Under this act, the government has the right, when it helps finance the construction of the ships, to use them as naval auxiliary craft in case of need.

It is well known that wherever an American ship goes, American trade expands. The advent of a magnificent ship like the SANTA CLARA to the South American trade under the famous Grace line cannot fail to be a big new factor in commercial relations with the west coast of South America. In 1914 we had five ships under the American flag between the United States and South America. Our total South American imports and exports, then, were $347,000,000. In 1927 there were 89 ships in this trade and it had expanded to over one billion dollars annually. In 1914 there was but a single line of American ships flying between the Pacific coast and the Orient and our trade was approximately $386,000,000. In 1927, 145 American ships were engaged in the Oriental trade and imports and exports had risen to $1,800,000,000, in which the expansion of American shipping facilities was a factor of great importance.

(*Continued on Page* 106)

Launch Morro Castle

New Turbine Electric Liner

for

New York—Havana Service

UNDER smiling skies, and as the usual traditional bottle crashed against her bow, truly directed by an adept sponsor, the new turbine-electric liner MORRO CASTLE was launched March 5 at the Newport News Shipbuilding and Dry Dock Co. Newport News, Va., This vessel is one of two sisterships in the big $10,000,000 building program by the Ward line for its New York-Havana express service. The ORIENTE, sistership of the MORRO CASTLE, will be launched at the same yard shortly, and both vessels will be ready in time to enter the Havana run this fall.

Miss Ruth Eleanor Mooney, daughter of Franklin D. Mooney, president of the Atlantic Gulf & West Indies Steamship lines, acted as sponsor at the launching. Her maids of honor were Miss Esther Gurney and Miss Betty Sayre both of Garden City, Long Island, and school friends of Miss Mooney. A large party of guests came on from Washington and New York to witness the ceremonies.

In building the MORRO CASTLE and the ORIENTE the Ward line adds another chapter to its interesting history as the two sisterships with a speed of 20 knots have the distinction of being the fastest turbine-electric liners afloat and are among the first in a great new fleet of American flag liners to be built under the aids provided for in the Jones-White act.

When these new electric liners enter service in the fall they will reduce the Ward line's present running time between New York and Havana from seventy-two to about sixty hours. This improved service will be maintained throughout the year and is expected to play a prominent part in aiding in the development of Cuba as an all year round tourist resort. Shippers are also assured of a regular dependable service at all times and the ships will have ample refrigerated space for the caring of perishable and semi-perishable products.

The MORRO CASTLE and ORIENTE represent the most advanced practice in engineering in the use of electricity as a propelling system. Two steam turbine generating sets furnishing current for two propulsion motors each direct connected to a propeller will develop a total of 16,000 shaft horsepower. This medium assures a minimum amount of vibration and noise, the absence of which means the maximum amount of passenger comfort.

Designed by Theodore E. Ferris, well known naval architect, the two new Ward liners will be of imposing appearance with seven decks, including four tiers of superstructure comprising the steel erections above the bridge dock and are of the complete superstructure type.

They each have an overall length of 508 feet, a beam of 70 feet 9 inches and a loaded draft of 26 feet, and are of 11,300 gross tons and 5700 net tons.

Public spaces in the interiors of the MORRO CASTLE and ORIENTE will be particularly pleasing. Their design is by Barnet Phillips Co. and J. Philip Kiesecker, associates, well-known interior decorators. The spaces are heated and ventilated from a central source ensuring cool or warm air as the weather may require without suggestion of stuffiness.

Each vessel carries 378 first-class passengers in outside staterooms and 90 of tourist passengers. The first-class is accommodated in special and regular staterooms, about equally divided, and some de luxe staterooms of generous proportion. Private baths and showers are liberally distributed throughout the ships.

The forward end of the promenade



Sponsor's Party at the Launching of the Morro Castle at Newport News Shipbuilding & Dry Dock Co., March 5, 1930. Left to Right—Homer L. Ferguson, Mrs. Franklin D. Mooney, Miss Betty A. Sayre, Franklin D. Mooney, Miss Ruth Eleanor Mooney, Sponsor, Mrs. Murray Sayre, and Miss Esther Gurney. *Launching Picture on Page 93*

deck is enclosed in glass, making a protected space for deck chairs. The after end, which is larger in area, is similarly enclosed and fitted up as a deck ball room.

A large space, practically forming part of the deck ball room, is devoted to a verandah cafe, entirely enclosed by glass casements.

Between the ball room and the enclosed deck and forward end is a long, unbroken promenade on either side of the deck. Opening onto these promenade spaces are the spacious casement windows of the lounge, smoke room, writing room, etc., giving their occupants clear view to the sea over low bulwarks.

Adjacent to the lounge, on the port end of the ship, is the writing room; painted in classic French detail, with furniture in the Empire style. A similar room on the starboard side of the ship is the library. The lighting of the library is subdued, but there are concealed reading lights in the wall. On the A deck is the playroom for children.

Two main stairways and elevators in the forward and after lobbies give access to the various decks. These lobbies are developed in the modernistic manner, with handsomely veneered mahogany as the predominating wood, inlaid with satin wood and ebony.

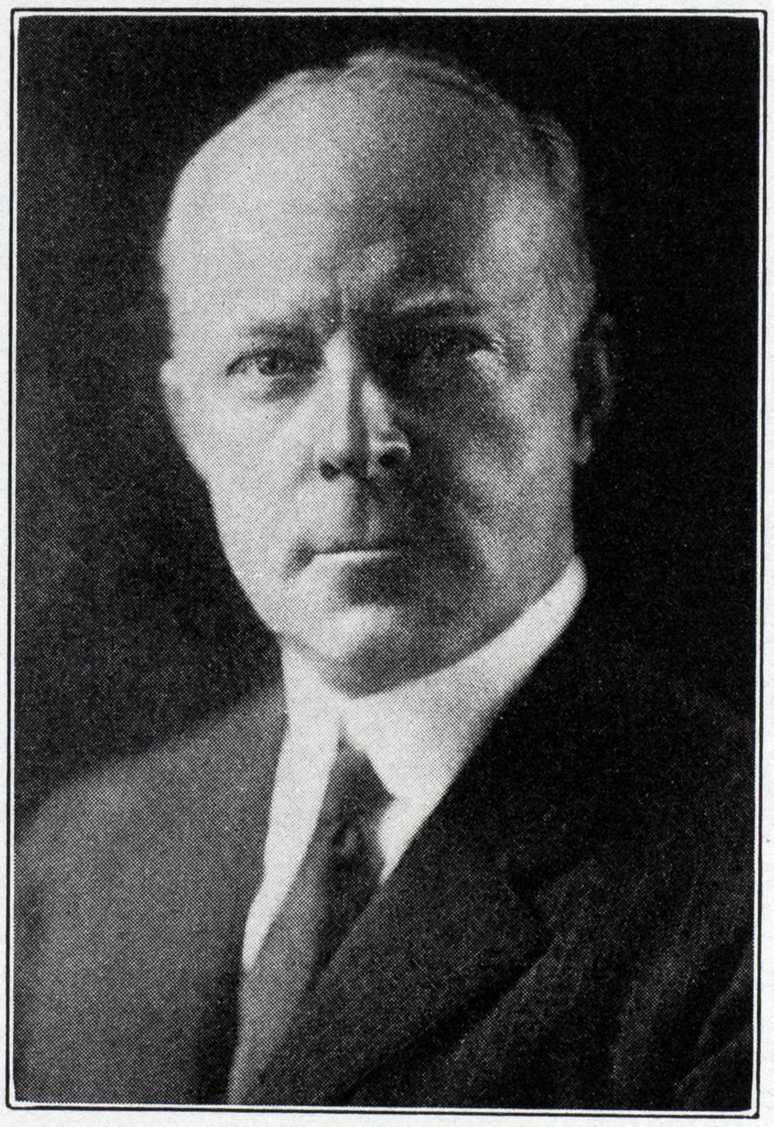
The smoke room and deck entrance lobbies follow the style of the Italian renaissance. The wood is walnut, ceiling soffits and panels are richly decorated in gold and color. Over the center of the smoke room is an arched semi-circular skylight in amber glass of two tones. The ends of the skylight are solid, and here are displayed beautiful mural paintings—two historical subjects dealing with the West Indies. The furnishings in mellow tones of velvet and brocatelle have an antique scheme, suggestive of the palace of the doges.

Forward of the midship lobbies is the lounge, executed in the style of Louis XVI. The walls are soft toned white mahogany ornamented in antique gold panels and mouldings. The ceilings are painted in soft tints, with decorative medallions in color. The room has a mezzanine, with a well-opening surrounded by columns and a bronze railing in appropriate detail. Large casement windows and a skylight in the ceiling of the mezzanine provide ample lighting.

The dining saloon is approached from a large lobby on the D deck. Cloak rooms are provided on either side at the entrances for convenience of passengers. Like the lounge, the dining saloon has a mezzanine, with a well-opening supported by columns of imposing proportions, running through two decks. There is a cheerful, bright note apparent here, yet the room is dignified and has been treated rather formally. At one end of the room is a framed oil painting of MORRO CASTLE on one ship, and a typical Cuban scene on the other vessel, the ORIENTE.

A telephone system is provided for ship's service and another independent telephone system is for the use of passengers. Annunciator systems are installed wherever required.

Nine transverse bulkheads, form ten water-tight compartments. There are two steel masts, one smokestack and one ventilating stack duplicating the smokestack in appearance. The



FRANKLIN D. MOONEY
President Agwi Steamship Lines

steel cargo booms are fitted to the foremast only, and a 25-ton derrick is installed here. These ships are sub-divided to comply with the United States steamboat inspection rules, and also in accordance with the 1929 conference for safety of life at sea. Electrically operated bulkhead doors are installed in the crews' quarters where communication between the various compartments is necessary.

Steam is supplied to the machinery consisting of two sets of General Electric steam turbine generators by six Babcock & Wilcox oil burning water tube boilers of seven fires each, operating under forced draft, said to be the largest built for marine use.

Ten lifeboats and two motorboats necessary to provide adequate accommodation for all on board are carried on Welin-MacLachlan boat davits.

Throughout all passenger and crew spaces, storerooms and other departments, an electric fire alarm system will indicate the presence of fire on a centralized panel in the pilot house. Fire doors in fire-screen bulkheads. hose chemical extinguishers and a watchman's clock system guarantee every known safeguard.

An American Engineering steering engine operates the rudder through a telemotor of like make. There is also a complete Sperry gyroscope system and automatic steering. A complete magnetic compass outfit supplements the Gyro equipment. A fathometer. two electric sounding machines, a radio direction finder, powerful whistle, independent fog siren, searchlight, helm indicators, tachometers, automatic and at-will whistle controls, all contribute toward making these ships the safest afloat.

A complete electrically equipped galley will enhance the already famous quality of Ward line cuisine.

Steel Hangars Protect Pusey & Jones Ways

Rapid progress is being made in the construction of the all-steel hangars on ways No. 1 and No. 2 at the yard of the Pusey & Jones Corp., Wilmington, Del. These heavily-built structures will offer complete protection to workmen and materials in all kinds of weather, permitting uninterrupted operation throughout the year and hastening delivery dates, due to the modern equipment housed within.

The new buildings will cost $400,000 and will each accommodate vessels up to 400 feet in length. They are 70 feet wide, with an operating height of 60 feet. The principal hoisting equipment comprises two 25-ton Niles overhead traveling cranes with a lift of 150 feet per minute and a traveling speed of 300 feet per minute. These overhead cranes are geared so that they may operate together to lift a load of 50 tons. Supplementing the overheads are four wall jib cranes of 3-ton capacity for the vast amount of incidental hoisting required in the fabricating of steel vessels.

The framework of the buildings is of necessity very heavy, since it supports the cranes and their loads. The roof is of saw tooth type with glass sash in the vertical sides. Steel sash and glass siding will provide maximum daylight and weather protection.

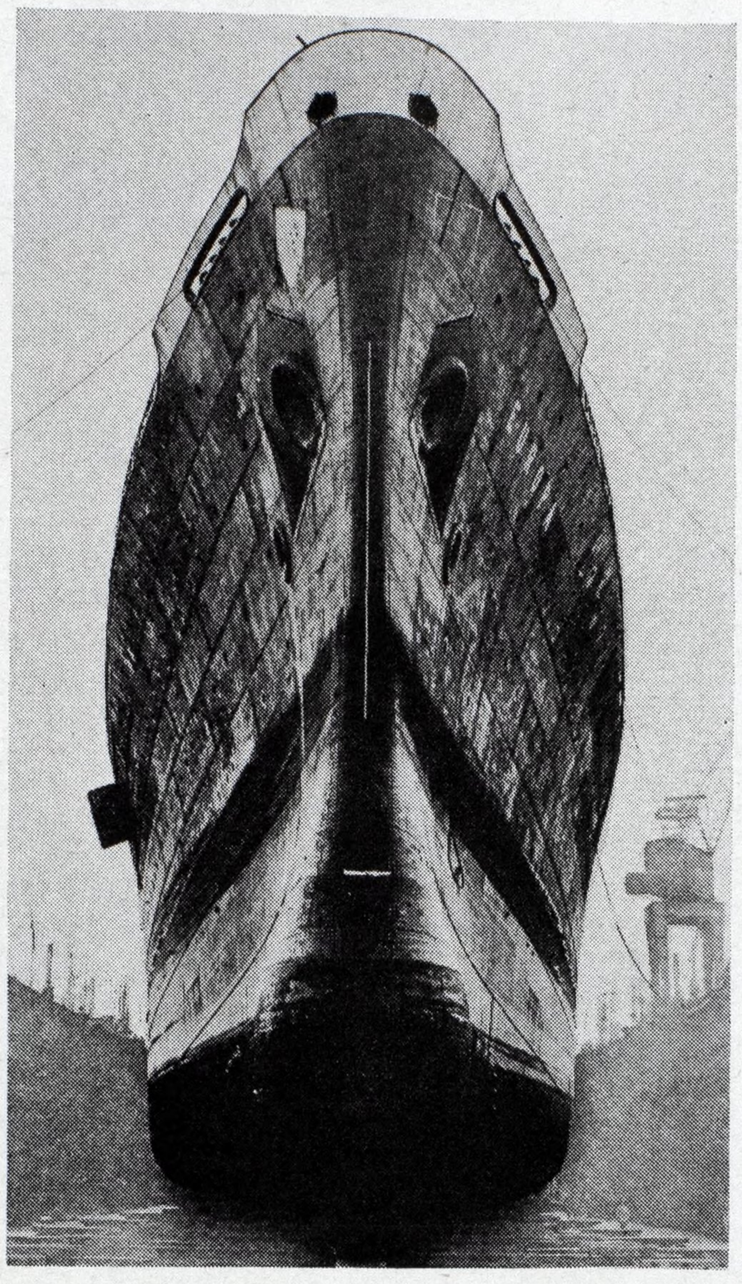
The United States cruisers DES MOINES, CHATTANOOGA and CLEVELAND were sold recently by the navy department to the Union Shipbuilding Co., Baltimore, for $80,000. The CHATTANOOGA and DES MOINES are at the Portsmouth yard and the CLEVELAND is at Boston.

Europa Breaks All Speed Records on First Transatlantic Voyage

THE EUROPA, new ocean greyhound of the North German Lloyd, arrived in New York from Southampton and Cherbourg on March 25 after smashing the record of 4 days, 17 hours, 24 minutes made by her sister ship the BREMEN. Her time on this maiden voyage in rough weather and head seas was 4 days, 17 hours, 6 minutes. Under favorable conditions and at the will of the owner it is believed that both vessels can make the crossing in still shorter time but that the EUROPA with greater power, though of deeper draft and correspondingly larger displacement, is the faster vessel. That this reserve of power and speed is held in leash pending competition is the opinion of informed shipping men.

While both boats were built under the same broad specifications for size and speed, they are nevertheless the products of different designers and different shipbuilders. The BREMEN was built by the Weser Shipyards in Bremen, the home port of the line, while the EUROPA was designed and built by Blohm & Voss in Hamburg, the builders of the three largest ships in the world, now named MAJESTIC, LEVIATHAN and BERENGARIA.

The EUROPA, like the BREMEN, has the bulbous bow, a device which almost miraculously creates "dead water" at the propellers, giving to them a push which they could not get if the water were rushing by. Her exterior appearance, except for certain minor details, is identical with that of her twin sister-ship. Her engines, like those in the BREMEN, are high pressure steam turbines, the latest and most important development in the construction of high speed vessels. It is understood that



S. S. EUROPA IN DRY DOCK—THE PRONOUNCED BULBOUS BOW LESSENS RESISTANCE AND INCREASES SPEED

the turbines of the EUROPA are more powerful than those of the BREMEN, but this advantage may be set aside by the fact that the EUROPA'S draft is greater.

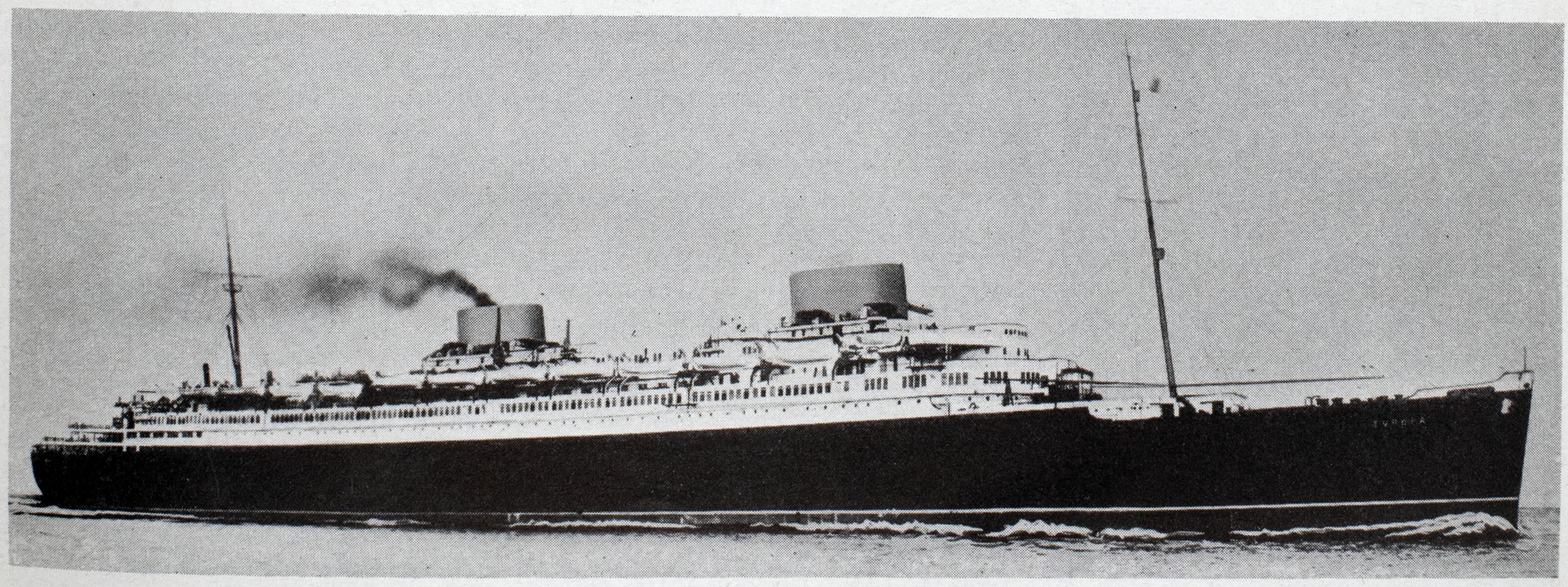
Where the EUROPA will actually present a different appearance than the BREMEN, according to officials of the line, is in her interior decoration. It is possible that the decorations of the EUROPA, while just as modern in spirit as those of the BREMEN, may not at first glance seem as startling. Each suite and stateroom in first class has a somewhat different color treatment. Throughout the decorative scheme of the EUROPA, there are various representations of the mythological princess of Asia after which the continent of Europe was named.

One of the features of the EUROPA will be long distance radio telephone apparatus similar to that with which the Lloyd liners BREMEN and COLUMBUS are already equipped.

With her sister ship the BREMEN, the EUROPA enjoys the highest official rating ever given to transatlantic liners. Prior to the advent of the BREMEN, the highest rating in the North Atlantic conference was class 1, but owing to the greater speed and to the size and modern conveniences of these two liners, a new rating was created called class A in which grouping these twin fliers are alone.

The overall length of the EUROPA is 936 feet and her breadth 101 feet. She will carry 2200 passengers, as well as a crew of 975 men. She has accommodations for 800 first class, 500 second class, 300 to 500 tourist class and 600 third class passengers.

The ship is equipped with Framm anti-rolling tanks, which will add greatly to the comfort of the passengers in making her quite steady.



QUADRUPLE SCREW TURBINE GEARED LINER EUROPA—NORTH GERMAN LLOYD—NEW SISTER SHIP OF THE FAST BREMEN

The boilers are located in two rooms, widely separated from one another, as indicated by the distance between the smokestacks. The engines also are in two separate watertight compartments, the bulkheads being arranged in such a way as to reduce to a minimum the possibility of both compartments being flooded at the same time in the event of collision.

To provide for emergency repairs on board the EUROPA there are complete machine plants, manned by skilled machinists, coppersmiths, blacksmiths and lathe operators.

There are seven watertight compartments in all for the boiler and engine plants. The auxiliary machinery as well as the electrical generators and dynamos are located aft of the main engine room. The main propulsion plant consists of two sets of turbines forward and two aft, each set, consisting of high pressure, intermediate and low pressure turbines, being connected with one of the four screws through single reduction gears which reduce the turbine speed of 2100 revolutions per minute to 210 revolutions per minute of the propellers.

Steam is generated in oil fired water-tube boilers and electric power is generated by four large diesel-driven dynamos supplying current to 420 electric motors of various kinds and an equal number of auxiliary machines. The ventilating machinery is required to circulate 3,200,000 cubic meters of air per hour. For emergency use the regular electric lighting plants are supplemented by two large diesel driven dynamos located on the sun deck.

Lifeboats of the EUROPA are all motorized and equipped with radio apparatus, and accommodate 4100 persons, 25 per cent more than the combined number of passengers and crew.

The propellers are of bronze, each cast in one piece. Each weighs about 14 tons.

The smokestacks, instead of being pear-shaped, as in the case of the Bremen, are of elliptical shape, measuring 50 feet long diameter, by 21 feet short diameter. The masts are approximately 236 feet in height from the keel. There are three bridges.

One of the most strikingly decorated features is the swimming pool. The pool itself measures about 20 by 35 feet and is lined with blue-green tiles. Brightly colored mosaics line the walls of the room.

Passengers in first class can take their meals in a special restaurant, located on the sun deck, which is open during the entire trip. All meals taken in the restaurant are charged separately and not included in the fare.

There is a separate library in each class on the EUROPA, having in all a total of 2000 books, of which 800 are contained in the first class library.

The EUROPA is equipped with three anchors, each of which weighs about 17 tons. They are 18 feet in length and 12 feet in width. The anchor chain links are made of forged iron having a sectional diameter of 4 inches. The chains have a total length of 2000 feet and weigh 150 tons to give an idea of the size.



CAPT. NICOLAUS JOHNSEN
Commander of the Liner Europa

The radio equipment of the EUROPA is of the most modern type and embodies the latest developments of the Telefunken company. The radio plant has been constructed in a manner to enable simultaneous operation of one long wave, two short wave, also local and emergency transmitters and receivers. This elaborate radio facility is a new development for a merchant ship and offers facilities for the prompt dispatch of all business and private messages to an unlimited number of stations afloat and ashore. There are no less than six separate antennae systems.

For the bunkering of the BREMEN, EUROPA, COLUMBUS and other vessels of the North German Lloyd fleet, a gigantic bunkering station has been erected at the Columbus quay, Bremerhaven. The EUROPA can be bunkered there in seven hours with 5000 tons of fuel oil and 100 tons of diesel oil. The oil is stored in eight tanks in the ship.

An unusual feature of the ship is that her name can be shown in electric lights on starboard and port sides over the windows of the sun deck restaurant amidships. The letters are of glass and 6 feet high. They are illuminated by 1200 electric bulbs which can be flashed alternately. The flags at the mastheads also can be illuminated at night.

The safety equipment of the EUROPA includes the most modern technical devices. The double bottom extends from the bow to the stern. Fourteen watertight bulkheads divide the ship into 15 watertight compartments. The bulkheading arrangement is such that even if two adjoining compartments are flooded the vessel will be perfectly safe at sea. The stern section of the ship will remain afloat even if three adjoining compartments are full of water. The reserve buoyancy of the ship has been calculated so that in the event of the first four compartments of the ship being filled with water, she would still remain afloat without affecting her propulsive equipment.

In addition to the assurance provided by this safety system, the EUROPA has been equipped with large non-sinking lifeboats, each of which is equipped with a motor enclosed in a watertight compartment which enables operation even though the boat is full of water. The capacity of each boat is 145 persons. They can be lowered in an incredibly short time. A complete fire fighting and fire extinguishing system is employed. In addition the ship is equipped with the usual instruments for safe navigation including radio direction finder, submarine signals, echo sounding apparatus and other devices.

The cable and wiring network of the EUROPA is over 600 miles long. Annunciators can be operated from over 10,000 locations on board.

Progress made in increasing the speed of transatlantic liners is shown by the fact that the fastest liners of the North German Lloyd in 1881 took 8½ days to make the run from Southampton to New York, while the KRONPRINZESSIN CECILIE, built in 1907, made the run from Bishop's Rock to Sandy Hook in 5 days, 10 hours and 20 minutes. The BREMEN, on her maiden voyage, made the run from Bishop's Rock to Sandy Hook in 4 days, 17 hours and 42 minutes.

Capt. Nicolaus Johnsen of the EUROPA is the commodore of the Lloyd fleet. He has been in the service of the company for over thirty years. Ten years ago he commanded the Lloyd's largest passenger steamer of 700 gross tons. Captain Johnsen was born in 1869 at Lubeck and went to sea at the age of sixteen. Until recently he commanded the COLUMBUS.

Overhaul Leviathan in Annual Lay-Up

Announcement was made lately at the offices of the United States Lines that the LEVIATHAN, flagship of the fleet, will sail from Pier 4, Hoboken, where she has been undergoing repairs and alterations, March 23, for Boston, where the vessel will enter the Commonwealth drydock for a routine inspection and repainting of the hull and a survey of the propellers and rudder. The LEVIATHAN will be ready to enter the basin about 5:30 a. m., Monday, March 24.

During the lay-up, the LEVIATHAN underwent one of the most extensive reconditioning, refurnishing and redecorating programs ever adopted for a monster ship. As soon as the vessel was withdrawn from her transatlantic service, work was started on the interior. This work will continue on the way to Boston, while she is laid up in the drydock, and on the return voyage so that she will be in first class condition when she will be ready to sail on April 12 for Cherbourg and Southampton.

Extensive changes were made in the passenger accommodations of the vessel. In first class, a night club to be known as Club Leviathan with sound motion picture equipment was installed. Rooms and suites were rearranged and a number of baths added. The rooms were redecorated and many of them refurnished. Second class accommodations have been eliminated entirely, this space now to be used by the tourist class. This gives the tourist class considerably more deck space and excellent outside rooms.

The LEVIATHAN will be in the Commonwealth drydock in Boston about 10 or 12 days, depending upon the amount of work required on the hull. Arrangements are to have the ship return to Pier 86, North River, her regular berth about a week prior to sailing during which the vessel will be refueled and provisioned to start on her first voyage for 1930—April 12.

Christopher Strachan, formerly with Walter Kidde & Co. Inc., New York, and J. F. Paige, formerly operating manager of the American Diamond line, recently announced the formation of the John Strachan Co., to continue the marine consulting, surveying and appraisal business of the late John Strachan. The offices of the new company are at 17 Battery place, New York.

More Shipping Board Vessels Are Sold

Sale of the steamers LAKE GERT, LAKE GAZETTE, and LAKE ELKWOOD to the Union Shipbuilding Co. of Baltimore for $25,500 cash, was authorized by the shipping board on Feb. 26. The vessels will be dismantled and scrapped. These ships are Lake type steamers averaging 4100 deadweight tons. The ELKWOOD has been laid up at Norfolk, and the other two vessels at New York since 1921.

The steamer EVERGLADES was sold to Capt. N. Lied of Porsgrund, Norway, for $18,600 cash, with the privilege of transfer to foreign registry. This sale was authorized following readvertisement and receipt of bids, upon terms and conditions indicating extensive bottom damage to the vessel. The expenditure of more than $50,000 by the purchaser will be required before the vessel can be made ready for sea. This expenditure will, of course, be made in an American shipyard.

The vessel is of 3657 deadweight tons, equipped with reciprocating engines and Scotch coal burning boilers.

The EVERGLADES has been laid up at New York since 1921.

Government Awards Mail Contracts

THE United States lines was officially notified by the post office department prior to March 15, of mail contract awards for the routes covered by this company on the North Atlantic. Specifically these routes are:

1. New York to London, calling at present for a weekly service with 16-knot vessels. Under the mail contract received, which is for five years, there is a proviso that it may be extended for an additional five years contingent upon providing two 18-knot ships of about 7000 tons each at a total cost of about $8,600,000.

2. New York to Hamburg, calling for a weekly service with 16 and 18-knot ships for the time being. Under the contract received two new 20-knot vessels of 20,000 tons are to be provided within five years, at an estimated cost of $7,500,000 each.

3. New York to Cherbourg, and Southampton, calling for 16 trips per annum with a 24-knot ship for the time being. Under the terms of the contract received which is for a period of ten years, two 28-knot vessels must be added to this service within four years.

This means that the United States lines can now go ahead with its program of new shipbuilding. Nothing now stands in the way of contracts being placed for the two 50,000 tons, 28½-knot super liners, plans and specifications for which have been under way for the past year. The same applies to the two 20-knot cabin liners; also for some additional intermediate tonnage.

The postmaster general has also announced that mail contracts have been awarded, to the Columbian Steamship Co. for the service between New York and Puerto, Colombia; and to the Panama Mail Steamship Co. for the service from San Francisco to Puerto, Colombia. The first of these contracts calls for the construction of two new vessels of not less than 5000 tons to cost approximately $1,700,000 each. In the second contract for the service from San Francisco to Puerto, Colombia, two new vessels are to be constructed of at least 8000 tons per vessel and costing, it is estimated, $5,000 000 each.

Further requirements on the route served by the Columbian Steamship Co. between New York and Puerto, Colombia call for building a new vessel of class 4 or reconditioning or rebuilding a vessel of minimum tonnage of 5000 tons.

The mail contract awards listed above were made only after many weeks of study on the part of the interdepartmental committee on ocean mail contracts, the members of which are the secretary of commerce, the secretary of the navy, the postmaster general and the chairman of the shipping board. The real objective of the committee is to carry out as effectively as possible the provisions of the Jones-White act in order to build up and to encourage in the most practical manner all efforts to establish a sound and economical American merchant marine adequate for the trade and commerce of the country.

On March 22, and since the above was written, Postmaster General Brown awarded five additional mail contracts including three to the United Fruit Co. and one each to the Grace lines and the Roosevelt Steamship Co. These contracts call for the building within the next few years of 11 new vessels aggregating 80,000 gross tons at an approximate cost

of $40,500,000. Total amount of these ten-year mail contracts for the first year is $2,423,394 which will increase in subsequent years as the new tonnage called for is added to the fleets.

The award to these companies is based on the bids issued Jan. 17, and for the United Fruit Co. are for services as follows:

1. San Francisco to Puerto Armuellas calling for a weekly service with 11½-knot vessels. Three 16-knot 6000-ton ships are to be provided within three years.

2. New York to Port Limon calling for a weekly service with 13-knot vessel. Three 16-knot, 6000-ton ships are to be provided within three years.

3. New Orleans to Puerto Colombia, calling for a weekly service with 11½-knot vessels. Two 16-knot, 6000-ton ships are to be provided within five years.

This means that in consideration of receiving these mail contracts, and an amount the first year, beginning next July, totaling $895,154, the United Fruit Co. is required to build in American shipyards eight 16-knot 6000-ton fully refrigerated ships totaling in cost about $30,000,000.

The Roosevelt Steamship Co. received the mail contract for the route from Baltimore to Hamburg calling for 52 trips per annum with 16-knot ships and replacement within five years by two 18-knot ships. Service will start within a year. Annual mail payments are to be $1,243,320.

The Grace Lines received the mail contract for the route from Tacoma to Valparaiso, calling for 17 trips per annum with 10-knot ships. One 18-knot vessel to be provided within three years.

The 10 new mail contracts outlined in this article call for a total of 22 new ships of 247,000 gross tons to cost approximately $141,500,000 to be built in American shipyards and completed in from three to not longer than five years.

New Era Predicted in Radiophone

In a recent test made with an experimental wireless outfit aboard the Hamburg-American line steamer HAMBURG, a record was established as to the number of contacts maintained simultaneously with different points.

In addition to her regular wireless equipment, the HAMBURG carried three new sets of apparatus for telegraphic and telephonic communication, a radiophone for short distances with a wave of 150 to 200 meters which proved effective up to 500 miles, a "modified" Telefunken transmitter working on a wave length from 600 to 800 meters, and a combination short wave phone and telegraph transmitter and receiver, capable of operating on any wave length between 15 and 90 meters. Together with her customary equipment, these new installations enabled the ship to cover practically every wave length, to maintain radiophone or wireless communication not only with both shores of the Atlantic during the seven days of the crossing, but also to get in touch with steamer RESOLUTE of the same line, Bombay, India, about 7000 miles distant.

The new wireless installation was in charge of Dr. Otto Pohle of "Telefunken," the German radio corporation and Engineer Spettnagel of the "Deby"—the abbreviated name for the German Wireless Operating Co.

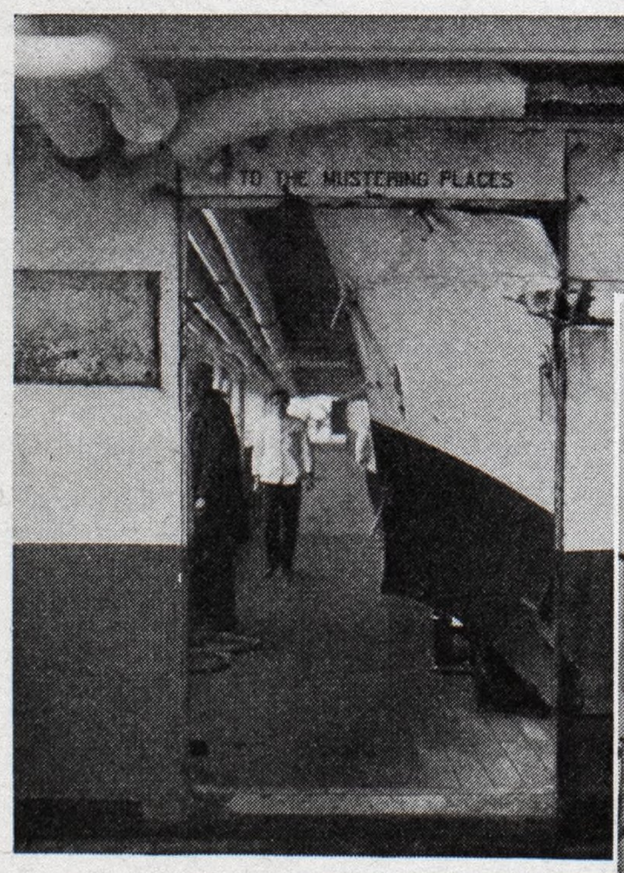
Ocean Liner Damaged by Huge Wave

WHEN the Holland-America liner VEENDAM reached New York recently from Europe, she was badly damaged by a gigantic wave that struck her in mid-Atlantic. She was in need of speedy repairs, for 300 passengers were waiting to board her for a cruise to the West Indies beginning three days later.

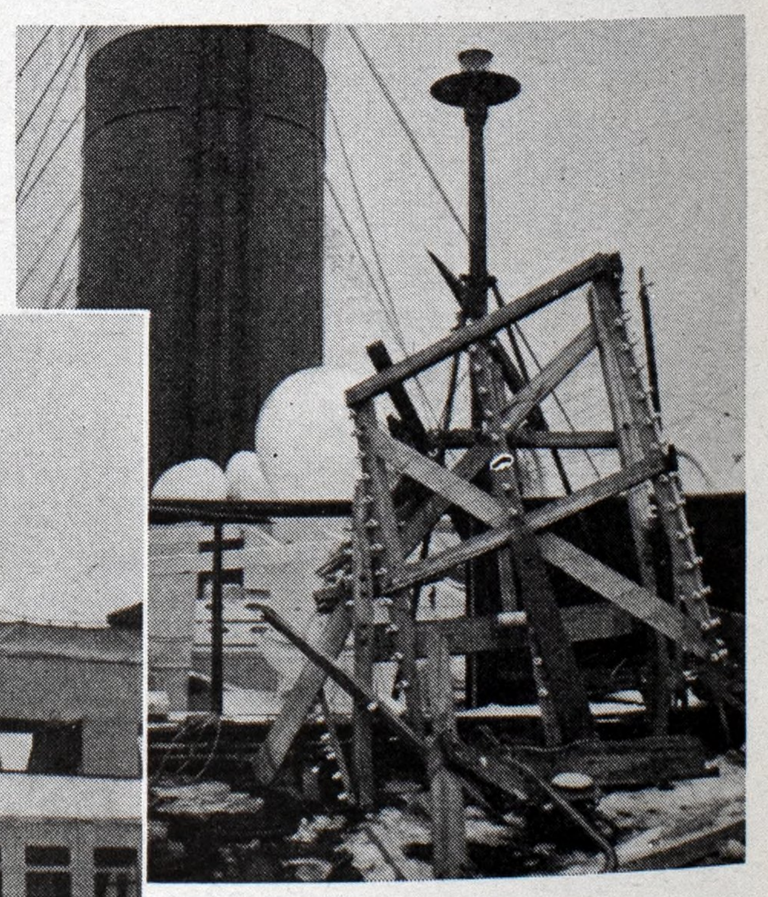
Repairmen were summoned from United Dry Docks Fletcher plant in Hoboken, and within a few hours more than 200 mechanics were aboard and the job was completed well ahead of schedule so that the liner was able to sail on time.

The damage was confined largely to the forward superstructure, the wave, estimated by Capt. R. W. Braun to have been nearly 100 feet high, having struck the ship head on. Number one hatch was crushed under the impact of the water, a steel bulwark just below the bridge was buckled and torn all along its length, and the port side of the bridge was smashed, as was the navigating bridge. The captain's quarters were under water for several minutes and the radio direction finder, compass and telegraph instruments were destroyed.

As the wall of water swept over the ship, stanchions and railings gave way and nearly a score of inch-thick windows along the promenade deck were smashed. The water cascaded through the first-class quarters, bowled over furniture and broke windows in the library. The destructive force of the great wave is best explaned in the accompanying illustrations.







Three Views Illustrating Damage Done to Liner Veendam by a Huge Wave. Left—Bulkhead Damaged by Force of Wave. Center—Showing Bent Kingpin. Right—Twisted Mass of Range Finding Apparatus

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	508	2,280,543	513	2,272,393
January	542	2,506,444	572	2,658,125
December	517	2,331,342	518	2,257,424
November	520	2,236,677	537	2,387,932
October	564	2,591,207	561	2,561,403
September	577	2,642,897	567	2,548,764
August	584	2,537,306	626	2,775,730
July	580	2,648,419	588	2,582,929
June	575	2,511,671	582	2,582,929
May, 1929	605	2,612,925	640	2,782,012

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	86	248,417	67	194,809
January	94	281,558	66	202,453
December	87	237,510	49	143,761
November	80	222,026	48	133,872
October	99	262,305	62	154,401
September	107	282,105	61	145,895
August	110	271,857	54	120,595
July	120	321,726	70	188,269
June	97	254,811	61	140,065
May, 1929	126	343,548	75	191,192

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	87	281,012	44	159,767
January	93	306,097	42	128,581
December	95	286,749	62	208,978
November	101	332,269	67	221,318
October	95	310,386	56	196,590
September	139	387,061	106	265,839
August	139	387,061	106	265,839
July	151	376,620	109	327,487
June	135	309,662	103	268,270
May, 1929	139	343,990	113	286,147

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	26	71,155	21	57,834
January	27	72,734	26	71,929
December	22	47,329	23	51,644
November	26	51,231	26	50,475
October	25	54,402	25	56,022
September	30	58,497	30	64,559
August	32	59,299	31	58,111
July	31	55,932	31	53,761
June	29	49,060	28	47,961
May, 1929	24	39,080	25	39,830

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	12	44,382	7	28,774
January	13	48,880	5	24,055
December	10	35,615	4	16,406
November	10	38,203	6	22,371
October	6	20,741	8	32,974
September	9	38,226	5	23,339
August	6	24,438	6	25,315
July	12	38,408	9	29,585
June	11	40,920	7	31,040
May, 1929	11	39,061	5	18,506

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	31	123,100	47	185,192
January	31	122,031	44	165,208
December	39	146,486	53	118,117
November	34	129,809	65	234,575
October	39	148,172	59	221,007
September	33	129,576	52	191,302
August	45	166,207	65	229,834
July	42	151,702	54	198,109
June	30	109,084	47	170,643
May, 1929	26	98,630	48	172,196

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	139	432,422	142	431,664
January	131	422,932	135	435,506
December	134	415,201	134	425,362
November	132	438,274	137	446,120
October	138	450,603	146	463,723
September	117	374,893	108	355,532
August	141	444,315	150	466,464
July	160	499,292	158	485,913
June	135	430,355	134	427,138
May, 1929	155	478,043	155	465,843

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	21	47,835	59	180,510
January	13	27,927	75	208,959
December	30	75,636	58	164,287
November	39	50,600	79	204,216
October	32	87,466	79	209,997
September	27	67,040	74	189,010
August	32	86,983	95	256,104
July	32	74,562	97	220,215
June	23	39,983	78	160,520
May, 1929	29	80,599	89	228,221

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	14	35,002	13	31,353
January	12	24,225	16	31,722
December	19	36,831	12	20,409
November	10	22,938	10	18,750
October	12	20,268	8	19,134
September	17	36,618	13	23,731
August	18	45,422	10	15,617
July	12	21,338	12	22,111
June	14	21,699	16	35,889
May, 1929	12	24,974	12	26,010

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	85	90,050	70	87,109
January	74	86,081	71	85,990
December	68	78,984	65	78,634
November	84	97,555	83	97,217
October	74	88,850	75	88,853
September	55	64,464	59	72,321
August	60	70,851	60	68,913
July	72	84,674	67	80,233
June	68	81,920	68	78,980
May, 1929	99	110,911	100	110,658

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	104	254,408	116	276,137
January	118	281,672	108	256,384
December	110	262,685	101	238,149
November	107	231,376	111	259,712
October	123	304,950	119	294,276
September	91	208,323	83	213,660
August	96	233,785	83	193,379
July	110	267,053	109	264,552
June	97	204,219	98	218,437
May, 1929	89	211,519	75	168,343

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	55	231,213	47	195,156
January	51	229,516	55	246,266
December	57	292,419	62	302,713
November	68	278,207	73	306,493
October	72	293,569	68	277,041
September	46	203,192	47	203,236
August	62	258,910	63	263,569
July	64	259,303	62	252,021
June	48	199,237	56	233,867
May, 1929	51	216,463	53	221,564

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	263	715,681	237	630,673
January	252	706,945	260	715,903
December	273	772,310	279	785,160
November	268	736,452	269	739,461
October	244	681,983	261	713,490
September	257	684,203	260	698,665
August	272	726,363	273	721,024
July	279	712,324	288	741,716
June	277	708,089	273	711,898
May, 1929	289	758,671	277	717,581

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
February, 1930	20	52,660	18	44,494
January	25	61,031	22	58,857
December	16	42,198	19	46,455
November	24	62,691	27	75,588
October	24	62,345	25	65,733
September	19	52,795	12	32,870
August	17	37,818	15	29,341
July	11	21,622	10	20,558
June	15	42,166	12	26,501
May, 1929	15	33,550	15	33,826

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	26	48,200	68	197,140
January	30	77,176	87	274,299
December	27	65,306	104	358,823
November	28	68,030	108	332,315
October	36	88,056	118	385,367
September	47	131,512	101	323,955
August	37	87,502	74	275,017
July	36	72,793	87	259,450
June	35	75,614	78	243,391
May, 1929	37	79,121	79	220,456

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	177	580,092	165	542,392
January	185	601,710	176	596,007
December	212	619,119	178	589,551
November	225	676,209	215	664,661
September	259	621,704	225	605,808
August	204	583,568	185	554,520
July	203	705,042	169	620,250
June	186	574,459	159	582,247
May, 1929	167	604,274	224	597,519

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1930	142	565,514	135	567,268
January	158	644,015	149	630,336
December	182	632,677	148	558,136
November	161	620,878	143	579,803
October	179	696,620	164	667,367
September	151	563,770	134	559,772
August	196	723,330	168	669,499
July	173	680,770	153	621,762
June	167	643,580	147	584,361
May, 1929	179	643,864	165	613,836

Port Arthur

(Including Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1929	22	76,344	26	87,941
April	21	79,267	23	81,991
March	25	76,152	27	81,778
February	16	53,310	21	68,705
January	22	68,758	24	76,496
December	21	65,710	14	43,776
November	23	71,313	23	69,425
October	19	58,857	19	58,686
September	22	73,785	24	79,696
August, 1928	25	78,765	23	72,389

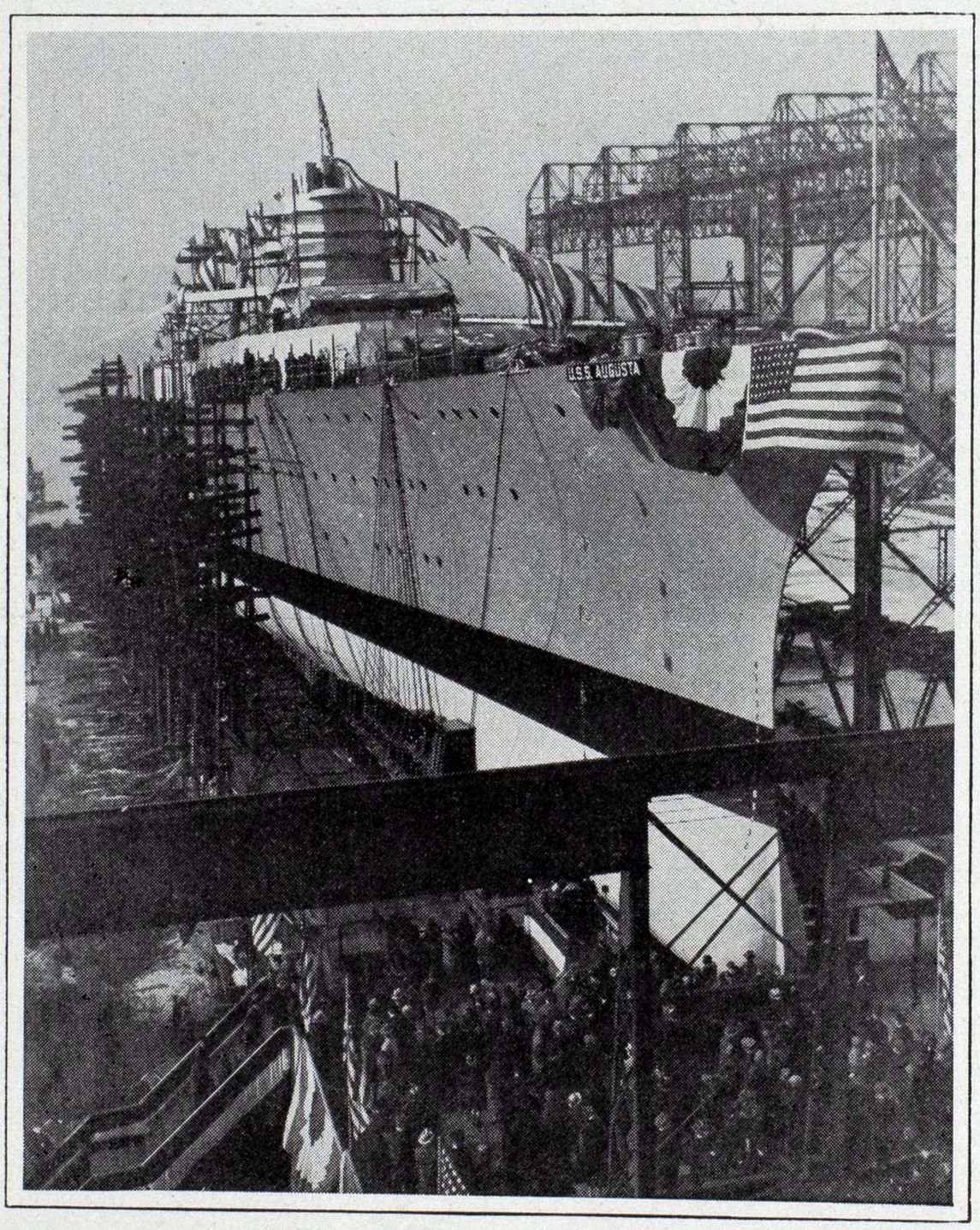
Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 53 of 179,876 net tons entered and 75 of 244,676 net tons cleared for the month of February.

Shipbuilding in Eastern Yards Reaches New High Peak

More Than 175,000 Tons of Steel Required for Work Now in Hand—New Methods Facilitate Construction

By A. J. Hain

Associate Editor, Iron Trade Review



Two scout cruisers were completed recently; six more are under construction and keels for two others have just been laid. Illustration shows launching of the U. S. S. AUGUSTA, *at Newport News, Va., Feb.* 1.

THE United States' tenth industry in point of steel consumption—shipbuilding—is speeding up at a time when the majority of the larger consuming lines are below their usual rates of activity. Shipbuilding in 1929 absorbed approximately 296,554 tons of finished steel, or 0.82 per cent of the total output in this country, according to the annual compilations by *Iron Trade Review*. This is in substantial accord with marine authorities who say the shipbuilding industry last year was operating at about 50 per cent of capacity, and that the American yards have facilities for fabricating 600,000 tons of steel annually. If yards were operating at maximum they could not overcome the deficiency in finished steel orders from other industries. But the importance of the acceleration in shipbuilding is that it provides business for mills in certain sections of the country, enables them to operate at a much higher rate than otherwise, and neutralizes the effect of industrial hesitancy.

Shipbuilding is one of the bright spots because it is unusually active and promises to be one of the market's chief supports, especially in the East, through this year. The shipbuilding industry as a whole is operating today at a higher rate than at any time since the World war, according to A. H. Jansson, editor, MARINE REVIEW, Cleveland. In the present year it probably will average higher than 75 per cent of capacity.

A heavy tonnage of steel for shipbuilding was placed late last fall and early this year, and it is this steel which now is being fabricated and delivered. Little tonnage has been placed since the first of the year, yet the American Bureau of Shipping reports that 94 vessels of 316,726 gross tons were under construction March 1 in the shipyards of the nation. Of these 29 were of the ocean-going and Great Lakes type, of a total 284,107 gross tons. Twenty-seven shipyards were engaged, 11 of them in constructing the larger type of ships.

AN impressive picture of shipyard activity along the Atlantic coast is sketched by Mr. Jansson, who recently completed an inspection trip through six of the nine largest yards. The plants which he visited are building or have contracts to build ships of a total of at least 350,000 gross tons.

The figures given are considered conservative because they include in each case only the visible and outstanding work in hand. Over and beyond this there is additional work in some instances running into appreciable tonnages.

"The Fore River plant of the Bethlehem Shipbuilding Corp., Quincy, Mass., has 68,292 tons of shipbuilding underway," he said. "The Newport News Shipbuilding & Dry Dock Co., at Newport News, Va., has 86,400 gross tons. At the Camden, N. J., plant of the New York Shipbuilding Co. 67,500 tons is contracted for or underway, and this yard is low bid-

This article is reprinted from the *Iron Trade Review* for March 20, 1930.

der on two 20,000-ton liners, the order for which may be placed shortly. Sun Shipbuilding & Dry Dock Co., Chester, Pa., has 64,200 tons; Federal Shipbuilding & Dry Dock Co., Kearny, N. J., 27,850 tons, and Pusey & Jones Corp., Wilmington, Del., 4830 tons.

"It is a fair estimate to say that approximately half of this gross tonnage, or 175,000 tons, is steel. This is exclusive of ships recently delivered, and of a large amount of repair work and reconditioning in progress at the yards. It represents new work underway, or about to be started this spring.

"I was never so much impressed on visiting the yards as I was this month, on seeing the vast amount of work now underway and contracted for. If I were to estimate it in money I would say $200,000,000 is being spent in the work now actually in hand at these six leading yards. The benefit of this is not only in helping to relieve unemployment, but in furnishing business to the steel mills, helping them to keep their working forces together, and tending to stabilize markets.

A VERY small percentage of this country's steel output goes into warships, but this government is spending about $90,000,000 on construction of scout cruisers now being built. Besides these, two cruisers were finished recently. Six are in various stages of construction and the keel for one more has just been laid, while the keel for still another is about to be laid.

"Each of these cruisers is of 10,000 tons displacement, and they cost about $11,000,000 apiece. It is fortunate that government work is being undertaken at this time. Contracts for three more cruisers were awarded to navy yards, but work was suspended during the negotiations of the disarmament conference. Government mail contracts call for the expenditure of enormous sums in the next few years for ships. Fifty or more vessels of around 500,000 gross tons to cost about $250,000,000 are included in this definite program for the next few years."

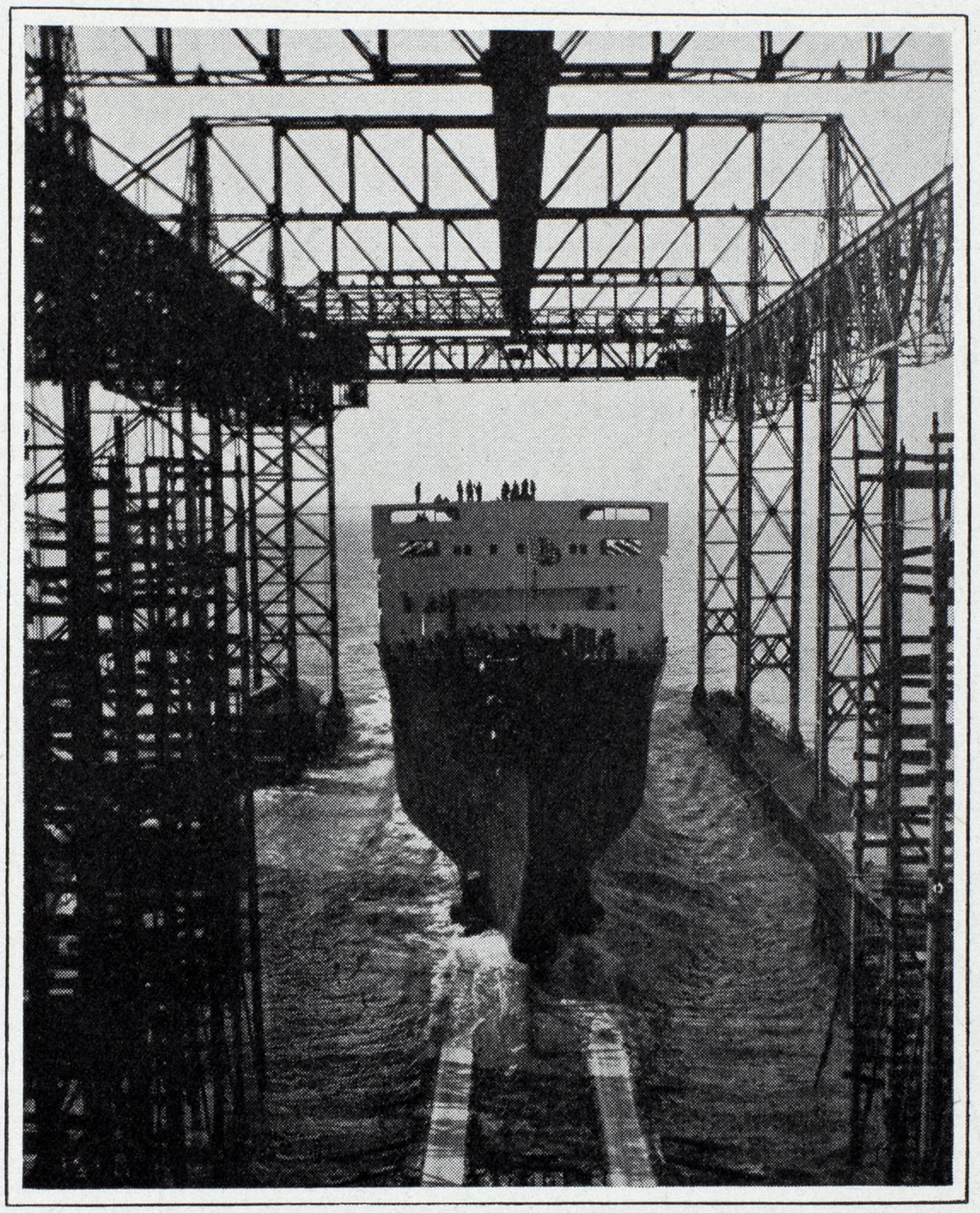
Not only did the volume of work underway impress this experienced student of marine affairs, but also the many new, improved and highly efficient methods of fabricating steel for ships. He visited the South Philadelphia works of the Westinghouse Electric & Mfg. Co., Lester, Pa., where main drive and auxiliary machinery for ships are being built on a large basis.

WHAT impressed me here," Mr. Jansson said, "was the great quantity of rolled steel stock, in various thicknesses from ½-inch and less up to 8 and 10 inches, and the manner in which blanks of various shapes were cut from heavy plates by means of cutting torches. They are using torches not only for cutting out perfect circles, but all kinds of irregular shapes, to be machined and used in lieu of forgings and castings. It seems there is a tendency to get away from the use of forgings and castings wherever practical, and to use rolled plate, cut to shape with torches. Some of the yards have found they can make parts by cutting and welding in less time than they can make the patterns for castings, and at less expense where only a few are to be made.

"Welding is being used to fabricate rolled plates, even in some instances into casings for turbines, an unusual procedure. Foundations for turbine generator sets are being made of plates and shapes welded. Shapes are cut out of plates as thick as 6 inches or more, quickly and economically by means of pantagraph torches; and this with the loss of only about 3/16-inch of the metal."

At the Federal shipyards, Kearny, N. J., Mr. Jansson saw two large tankers under construction, but here again he was most impressed by the welding method of building channel steel barges. Two large heavy steel barges were being built by methods as nearly 'automatic' as he could conceive. The barges are scow shaped.

"The channels are laid down on horses in the shop," he said. "Between each channel there is placed a filler of thin rolled steel. The channels are then clamped together and spot welded to hold them in position. A welding machine on wheels rolls along and welds the heel of the channels, and the section is then turned over and the toe is welded in a similar manner. The ends of the barges are built up of plates.



Launching of the MORRO CASTLE, *11,300 gross tons, at Newport News, Va., March 5. Many large passenger ships, cargo vessels and tankers are being built in the yards along the Atlantic coast.*

NEW construction of major ships is so great that the Fore River plant of the Bethlehem Shipbuilding Corp. is working near capacity, and with additional work contemplated and likely to be closed with this yard the plant will have about as much as it can comfortably take care of all this year, and well into next year.

"Here they are laying the keel for a 10,000-ton scout cruiser, and are building two tankers each of 6700 gross tons for the Sinclair Navigation Co. A passenger vessel of 7000 gross tons is being built for the New York & Porto Rico Steamship Co.;

three tankers each of 800 gross tons for the Lake Tankers Corp. The company has the contract and will shortly lay the keels for two passenger vessels, each of 17,500 gross tons, for the Matson-Oceanic Steamship Co. It is completing the scout cruiser NORTHAMPTON.

"This yard is fabricating about 700 tons of steel weekly. Two superliners, each of 50,000 gross tons for the United States line are to be placed, it is believed, before the year is over, and this yard is generally considered as having a good chance of obtaining the order for one of these giant ships.

"I noticed also that the Sparrows Point, Md., yard of the Bethlehem Shipbuilding Corp. has reopened as a shipbuilding plant, and is employing about 800 men. Bethlehem's Baltimore Dry Docks plant also is busy on ship repairs.

AT THE Camden, N. J., yard of the New York Shipbuilding Co., where 67,000 gross tons of shipbuilding is underway, three large passenger ships are being built. One of these the SANTA CLARA for the Grace Line Inc. is ready for delivery. One cruiser is nearing her trial trip, while the keel is about to be laid for another. Several large car floats are under construction. This company is low bidder on two cabin liners, each of 20,000 gross tons, for the United States Lines, costing $16,000,000.

"The Sun Shipbuilding & Dry Dock Co., Chester, Pa., recently delivered a passenger and cargo vessel, and tankers, totaling 30,000 gross tons, and now has underway seven 9000-ton ocean-going tankers and two smaller tankers, all aggregating 64,200 gross tons.

"The Newport News company launched on March 5 the 11,300-ton passenger ship MORRO CASTLE for the Ward Line of the Agwi Navigation Co., and will have ready for launching this summer the sister ship ORIENTE. It has contracts and will lay the keels soon for two great passenger ships for the Dollar Steamship Line Inc. Ltd. Each of these will be 21,900 gross tons. It has overboard and is completing two light cruisers, each of 10,000 tons displacement. It recently delivered considerable work, including the PENNSYLVANIA, a passenger vessel of 20,526 gross tons for the Panama Pacific line of the American Line Steamship Corp.

"A lot of reconditioning on ships for the Dollar Line and the United States shipping board has been done at this yard. One of the proposed giant liners for the United States Lines may be awarded to this yard during the year. I noted also at this yard a large, elaborate and beautiful steel yacht, of 1300 gross tons, built for George F. Baker Jr., son of the banker. Eastern yards are engaged on a number of palatial yachts including a new CORSAIR, costing over $2,000,000, for J. Pierpont Morgan, at the Bath Iron Works Corp., Bath, Me.

"Pusey & Jones are completing several seagoing steel yachts and right along side of these aristocrats of the sea, which help to swell the tonnage of steel consumed, there will soon be building four large tug boats, at an aggregate cost of $1,000,000 for the Baltimore & Ohio railroad."

Three major ships are under construction in yards on the Great Lakes. One other was launched recently. The total for the four is 13,730 gross tons. Forty barges were awarded in the Pittsburgh district since Jan. 1, these requiring approximately 6000 tons of plates and shapes. This compares with awards a year ago of 89 barges which required a total of 11,000 tons of steel.

Awards for the first quarter last year included 145 barges, 24 pontoons and a consumption of 19,000 tons of steel. Pending barge business will take about 10,000 tons of plates and shapes, and the outlook for the latter part of the first quarter is somewhat better.

Stresses Need for More Ocean Cargo Ships

Need of more cargo vessels operating under the American flag and further legislation for financial assistance so that vessels may be constructed in American yards was stressed by H. G. Smith, president, National Council of American Shipbuilders, before the New York board of trade recently. He asserted that between 600 and 700 cargo vessels now are under American operation, but as many were constructed during the World war replacements will be necessary within the next few years, and many additional ships should be put in service.

New vessels of this type will not benefit from the mail provision of the Act of 1928, but may participate in the construction loan fund of the Act. This, however, is not in itself sufficient to overcome the cost differential between an American built and a foreign built ship.

He said that the cost of construction of merchant vessels is from 50 to 60 per cent more in this country than in foreign countries, due in a large measure to the fact that wages here are more than double those abroad.

He presented several reasons why merchant ships should be built in this country in the face of this obvious handicap. Mr. Smith declared that approximately 80 per cent of the cost of merchant ship is wages of which one-half is paid to workmen employed within the shipyards and the other half to those employed away from the yards in plants producing materials and equipment. Each state contributes something in the way of material and equipment. A combination cargo and passenger vessel costing $3,750,000 will give employment to about 2000 workmen for one year well distributed throughout the country, he said.

Port of Boston Shows Rapid Growth

A new report on the port of Boston, prepared jointly by the bureau of operations of the United States shipping board and the board of Engineers of rivers and harbors of the War department has just been published. The report contains 238 pages of text illustrated with pictures, maps and graphs, portraying harbor conditions and commercial statistics at the port.

Boston is shown to have a natural harbor, practically land-locked, with some 280 piers along its 141 miles of waterfront. Its wharves and docks are equipped with modern mechanical handling machinery and there are large dry docks, grain elevators, and numerous warehouses.

Next to the improvement noted in harbor conditions and handling facilities, the outstanding feature of the report is the increase shown in Boston's commerce in recent years. From a total of 6,287,000 tons in 1920, the annual commerce rose steadily to a total of 17,266,162 tons in 1928. The most striking feature of this progress was the increase in domestic coastwise receipts and shipments. Such receipts increased from less than 4,000,000 tons in 1920 to nearly 11,000,000 tons in 1928, while the coastwise shipments increased from slightly over 800,000 tons to about 2,000,000 tons.

The fiftieth anniversary of the American Society of Mechanical Engineers will be celebrated from April 5 to 9 in Washington, Hoboken and New York. The celebration will open in New York on April 5 with registration at the United States Engineering Societies building, 29 West 39th street.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

DUE to the fact that mail contracts for all three services covered by ships of the United States lines were awarded by Postmaster General Walter F. Brown, it is expected that the United States Lines will go ahead with its $90,000,000 shipbuilding program. This program includes two superliners to run with the LEVIATHAN in the Southampton trade and two fast 20,000-ton vessels for the Hamburgh service. In addition, two 18-knot liners are to be built within five years for the London service.

Plans for the two superliners to cost $30,000,000 each have already been laid before the shipping board by Paul W. Chapman of the United States lines and it is understood that as soon as the shipping board and the navy department approve the plans American shipbuilding companies will be called on for bids for the construction of these two vessels.

Bids have already been received for the two 20,000-ton vessels which are to be of 20-knot speed and to be completed in 1932. It is reported that the New York Shipbuilding Co. with its low offer of about $9,500,000 each will be awarded the contract in the near future.

Tugboats for Boston

The first electrically operated tugboats to be used in Boston harbor will be two now being built for the Mystic Steamship company of Boston. These two boats will be 90 feet in length and will be equipped with diesel-electric propulsion. They will probably be put in service this fall.

Electric equipment for both propulsion machinery and auxiliaries will be supplied by the General Electric Co. Each boat will be driven by a single screw direct connected to a 515-horsepower, 125-revolution per minute double motor. Power for driving the motor will in each case be furnished by two 213-kilowatt, 300-revolution per minute main generators driven by Winton engines. Power for auxiliaries will be furnished by two 25-kilowatt, 300-revolution per minute generators coupled to the same shaft as the main generators.

The electric propulsion machinery will be governed by the variable voltage type of control, utilizing four separate control stations, one on either side of the pilot house, one in the engine room and one on the after deck. These will be the first electrically propelled boats to be built for the Mystic Steamship Co.

To Build Four Vessels

Preliminary applications have been received from the shipping board from the Grace Steamship Co. and the Panama Mail Steamship Co. a Grace company subsidiary for loans to be used in aid of building four 14,000-ton displacement combination passenger and cargo vessels of 18-knot speed for the Central and South America trade to be operated as United States mail carriers in accordance with the Jones-White act.

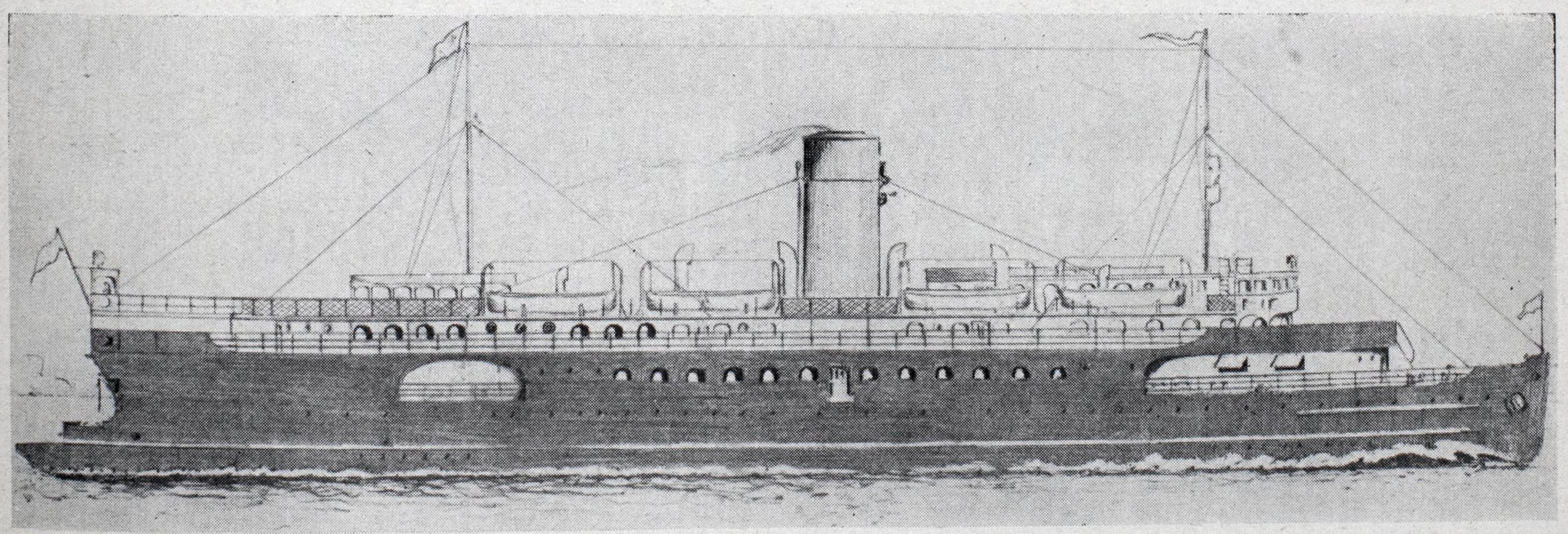
The vessels are to be operated on the company's route from San Francisco and Los Angeles to West Coast ports of Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica through the Panama canal to ports of Colombia and sent to Cuba and New York returning by the same route to San Francisco.

The principal dimensions of the vessels are: Length over all 500 feet, beam 64 feet, draft 25 feet, displacement 14,000 tons. Turbine electric power is to be installed and the vessels will have a shaft horsepower of 12,000 and will burn oil. The speed of the new ships will be 18 knots and accommodations for 150 to 200 cabin passengers and 500 tons refrigerating cargo will be available.

Award Carferry Contract

Contract for the Canadian government carferry to be operated between Prince Edward Island and New Brunswick has been awarded to the Davie Shipbuilding & Repairing Co. at Levis, Quebec, subsidiary of Canada Steamship lines. The estimates now before the Canadian house of commons provide for a vote of two and a half million dollars to meet the cost of construction of this vessel.

The ferry, which constitutes one of the largest orders received by a Canadian shipyard this year, will be larger and sturdier than the PRINCE EDWARD ISLAND now in this service.



Sketch of the proposed carferry to be built for the Canadian government by the Davie Shipbuilding and Repairing Co. of Levis, Quebec, a subsidiary of Canada Steamship lines. The new ferry will accommodate 40 automobiles and 16 railroad cars

The new ship will alternate on the run between the island and the mainland and will embody improvements and conveniences based on experience with the older ship. Her principal dimensions will be: length overall, 324 feet; moulded breadth at main deck, 59 feet; depth, 25 feet; extreme draft, 19¼ feet. The hull will be of steel specially strengthened to meet the necessities of the traffic with seven water-tight bulkheads and double bottom for water ballast. She will have two oval funnels, one on each side amidships and four decks. She will have a screw at each end driven by oil fired boilers supplying steam to triple expansion engines of 8000 indicated horsepower. Quarters for a crew of 35 will be provided. The central part of the main deck will be for transportation of railway cars which will be taken aboard at the after end and run on three sets of tracks which will provide accommodation for 16 modern freight cars as compared with ten on the present ship. The automobile deck will have a parking space for about 40 automobiles running right around the ship. Passenger accommodation will include mezzanine deck, main saloon, general lounge, ladies lounge, dining room, lunch counter and news stand. Plans were prepared by the firm of Lambert & German of Montreal.

Tankers for Great Lakes

It has been reported that six tankers have been ordered in Great Britain for operation on the Great Lakes and St. Lawrence River trade. Two new vessels have been ordered for the McColl-Frontenac Oil Co. from the Furness Shipbuilding Co. Each of the vessels is to be 1830 tons deadweight and is capable of carrying 13,500 barrels on a 14-foot draft in the St. Lawrence River or a full loaded deadweight tonnage of 3670 tons on a draft of 21 feet. In transiting the new Welland canal, 27,000 barrels may be carried by the new ship.

Four tankers, two of which are to be used between Montreal and Ottawa, two between Halifax, Montreal and Toronto, have been ordered by the Imperial Oil Co. from the same builders. These vessels are to be named the ACADIALITE, SIMCOELITE, OTTAWALITE, RIDEAULITE. The addition of these four new vessels brings the fleet of the Imperial Oil Co. up to twelve carriers.

New Motorship in Passenger Service

THE new $200,000 motorship GRAND MANAN II shown in the accompanying illustration is said to be the only Canadian ship on the Atlantic seaboard that makes daily trips to American ports. This vessel is the largest and finest equipped ship operated at the extreme east Maine frontier coast in international waters. The operating company was organized more than 35 years ago and during that period owned and operated several steamers for carrying mail, passengers and freight.

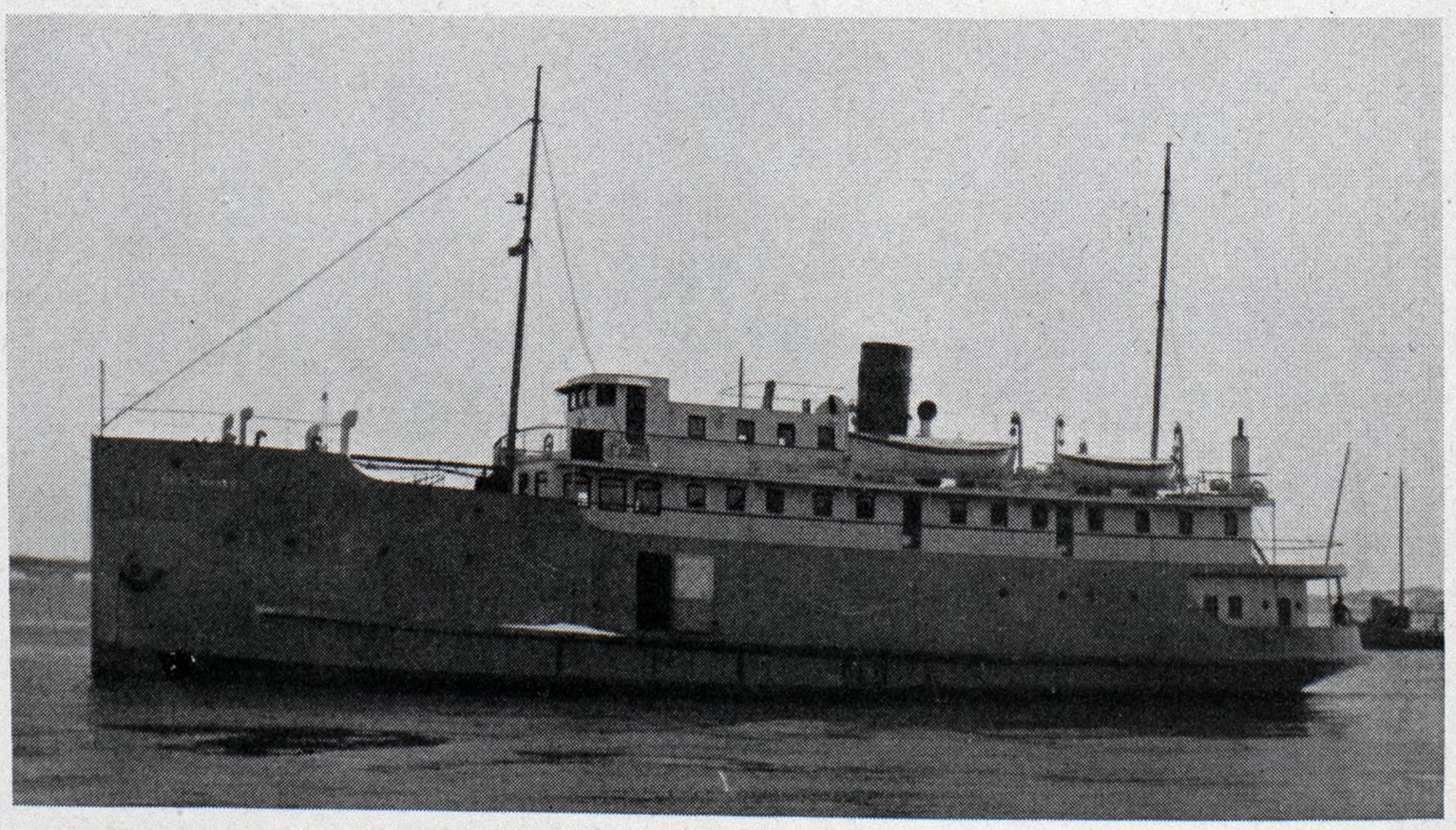
The route of the vessel extends from the 22-mile Canadian island of Grand Manan, New Brunswick, in Bay of Fundy, to Eastport, Maine 15 miles away. Daily stops are made at the Canadian islands of Campobello, N. B., Deer Island, N. B. and the mainland of New Brunswick and Canada and at the frontier seaports of St. Andrews, St. Stephen and St. John, N. B. The longest daily round trip made is not over 60 miles. The keel of the new steel motorship GRAND MANAN II was laid last September at the St. John, N. B. Dry Dock for the owners eastern Canada Coastal Steamships Ltd., and within five months the new ship was in commission, just one week after the old wooden steamer GRAND MANAN had made her last trip and was considered unsafe for further service. There are on the Canadian island of Grand Manan several prosperous fishing villages with a total population of about 3000 people. Campobello island has more than 800 people, and Deer island nearly 1000 people. The many island fishermen and their families can now travel safely with comfortable accommodations the year round, and can make daily trips to Eastport, Maine, the extreme easterly city of the United States.

The new motorship is 152 feet long with the following dimensions: Length between perpendiculars, 144 feet; beam moulded, 32 feet; depth moulded, 13 feet 6 inches; height between decks, 10 feet; draft, 10 feet. There are 5 watertight compartments. The vessel can carry 200 passengers, 20 autos and 200 tons of general freight.

The propelling machinery consists of a 6 cylinder Fairbanks-Morse diesel engine, of 900 horsepower at 260 revolutions per minute. Speed is 12½ knots. The boat has built-in auxiliaries. Her oil bunkers hold 40 tons of fuel equivalent to three weeks' steaming radius.

The direct reversible diesel engine has the following built-in auxiliaries: Oil circulating pump for lubrication; water circulating pump; bilge pump; and air compressor, operated by the main engine. It is the largest engine of the type in East Canada waters. Starting is by means of compressed air carried in four storage tanks at 27 pounds pressure.

Other auxiliaries include two 20 kilowatt Fairbanks-Morse diesel generator sets for providing lights and power for operating the motor drivers. General service, fire, stand-by oil circulating pumps are provided for other uses. Fresh water for drinking and salt water for other purposes, are distributed throughout the ship by automatically operated Fairbanks-Morse water systems. Hot water is provided by an



MOTORSHIP GRAND MANAN II OPERATED BY EASTERN CANADA COASTAL STEAMSHIPS LTD. BETWEEN GRAND MANAN ISLAND, CANADA, AND EASTPORT, ME.

electrically operated heater of ample capacity for all requirements air for scavenging is supplied by a built-in scavenging pump. An oil-fired steam boiler furnishes steam necessary for heating the ship, operating the steering gear, the winches and whistle.

The interior appointments of the new vessel are principally of mahogany, with oak panels, full carpets, wine-tinted plush seats, wicker chairs and attractive curtains.

The bridge, pilothouse, chart room and officers' quarters are on the forward top deck, with a large and attractively equipped smoking saloon adjoining.

There is a large public dining saloon in connection with two mess rooms for the crew, a pantry, galley, baggage room, and plenty of room on the lower deck for the usual freight.

March 13 the new boat made her first trip to St. Stephen, N. B., via Eastport.

Converting Collier

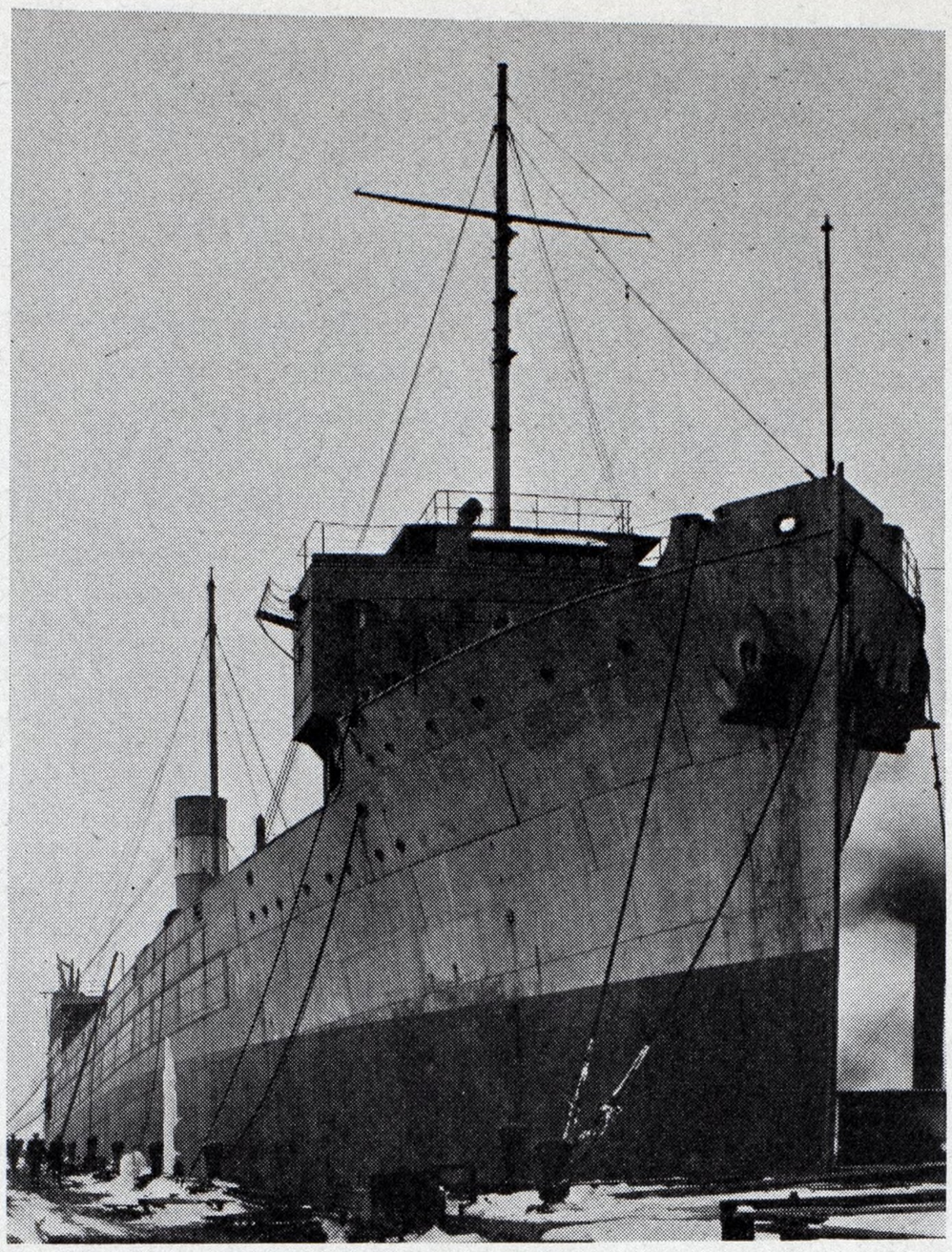
Resurrected from idleness forced upon it by the economic conflict between coal and petroleum, the naval collier ULYSSES is being rebuilt now as an oil tanker. The ULYSSES, when completed, will be the fastest and one of the largest tankers in the world, it is said.

Purchased from the Panama canal by the American Tankers Corp., the vessel is undergoing her transformation in the Staten Island plant of United Dry Docks Inc., of New York. United Dry Docks will have the collier converted and ready for duty within five months, as against the 15 or more months required for construction of a new tanker.

Plans of the new construction have been approved by the navy, which is considering similar transformation of several other colliers.

In the rebuilding, more than 1500 tons of new steel will be used. Following the most modern tanker construction methods, two longitudinal bulkheads 260 feet long and eight athwartships will be installed, giving the vessel 24 tanks with a capacity of 110,000 barrels. Each tank will be fitted with heating coils and cargo piping leading to new fast pumps which will permit discharge of a full cargo in the exceptional time of 15 hours.

When completed the ULYSSES will represent an outlay of about $1,000,000 and in every respect will be a thoroughly modern tanker. Having a total deadweight in excess of 14,000 tons, she will accommodate cargoes up to about 110,000 barrels of petroleum, and thus, in size alone, will be among the largest tankers in the world.



FORMER NAVY COLLIER ULYSSES WHICH IS BEING CONVERTED TO AN OIL TANKER BY UNITED DRY DOCKS INC. FOR AMERICAN TANKERS CORP.

Powered with twin screw engines developing more than 7000 horsepower, the ULYSSES will attain approximately 15 knots, which makes her one of the fastest tankers in the world. She will be fitted with new propellers designed by Rear Admiral Dyson, retired.

These outstanding characteristics contributed to the decision of the shipping board to employ the construction loan fund to aid in the conversion of the ULYSSES.

With her propelling machinery located aft, and her navigating bridge forward, the ULYSSES will conform to the conventional tanker design. Her interior bulkhead and tank arrangement is in accordance with the most modern practice, the division of length with two longitudinal bulkheads, instead of one, serving to greatly augment her structural strength.

It is understood that the American Tankers Corp. expects to duplicate this vessel in every essential particular in the construction of new tanker tonnage for the near future.

Built by the navy in 1915 to carry coal to the Panama canal, the ULYSSES is 514 feet long, 65.2 feet wide and 36.5 feet deep. For several years she was tied up at the canal, where she was purchased by the American Tankers Corp. The conversion is in progress at the Staten Island plant, United Dry Docks' shipbuilding yard. The ULYSSES will be ready for service in June.

New Erie Tug Boats

As announced in the March number of MARINE REVIEW contract for building four steel tugs was awarded the Pusey & Jones Corp. by the Erie Railroad Co. These new vessels are to be diesel electric driven and will be among the most powerful tugs operated in New York harbor.

The four new vessels were designed by J. W. Millard & Brother, naval architects of New York City. The principal dimensions of these vessels are: Length over all 108 feet, beam 25 feet, depth 13 feet 9 inches. The electrical equipment for propelling the boats and operating the auxiliaries will be furnished by the General Electric Co. The power plant on each vessel will be an Ingersoll-Rand diesel engine driving two 330-kilowatt motors at 270 revolutions per minute. The main engine will also drive 250-volt main generators and two 30-kilowatt motors at 270 revolutions per minute, as well as 120-volt auxiliary generators. The single propeller of each vessel is to be driven by an 800-horsepower 500-volt double motor at 105 to 135 revolutions per minute. Variable voltage control will be used to install control stations in the engine room and in the pilot house.

Turbo Electric Liner

Announcement has been made by the Furness-Bermuda Lines that the contract for the fast modern turbo-electric liner for the New York-Bermuda service is about to be placed and that the vessel which is to be called the EMPIRE STATE is to be ready for service in June of 1931. Details of the new vessel have been placed before H. C. Blackiston, managing director for the Furness interests in the United States by the English naval architect David Boyd and his colleague R. R. Chisholm. Increase of the tourist trade of the line to Bermuda has compelled the com-

pany to build the EMPIRE STATE which is to be larger and more luxurious than the BERMUDA, the company's flag ship which entered the service two years ago. The EMPIRE STATE will be of 23,000 gross tons and will have accommodations for 857 first class passengers. The passenger capacity of the BERMUDA is 690 while its gross tonnage is 20,000. The company has selected turboelectric drive for the new vessel. There are to be spacious public rooms and wide decks and it is said that leading artists of England and the Continent will carry out the work of decorating the new ship. Practically all of the passenger accommodations on the new vessel will have adjoining private baths or showers.

The new 23,000 gross ton turbo-electric liner to be built by the Furness line for its New York-Bermuda service will be most modern in type. The new vessel, which is to be ready for service in June, 1931, will be 576 feet long, 76.6 feet beam, and will have accommodations for 857 passengers.

Hermann Blohm, founder and senior partner of the world-famous shipyards of Blohm & Voss, Hamburg, builders of the new liner Europa, died on March 12 at the age of 82.

To Build New Liner

The New York office of the Newport News Shipbuilding Co. has announced that it has closed a contract with the Peninsular & Occidental Steamship Co., of Jacksonville, Fla., to construct a turbine liner for the company's Florida-Havana service.

The vessel will be of 6000 tons displacement, 389 feet long, with a speed of 19½ knots. Accommodations will be provided for 612 first class and 130 second class passengers. The liner will be completed in the fall of 1931 and will be operated all the year between Tampa, Key West and Havana.

Double Ended Ferryboat Is Launched

THE ferryboat CITY OF HAMPTON, launched March 8, at the plant of the Maryland Dry Dock Co. in Baltimore for the Chesapeake Ferry Co., is unique in some parts of her design, with the result that when in service she will prove to be one of the "biggest" vessels of that type, for water line length. The sponsor at the launching was Miss Ada K. Shields, niece of John H. Rodgers, president of the Chesapeake Ferry Co.

With dimensions of 157 feet overall length, 43 feet ¾ inch width over guards, 11 feet 6 inches depth, and 6 feet draft in salt water, a view of the plans shows that this new boat will have unusual accommodations. The yacht-like lines of the steel hull show an under-body that will be easy to steer and handle on the difficult course of the new vessel between Fortress Monroe and Willoughby Spit across the entrance to Hampton Roads.

The propelling machinery consists of a 550-horsepower Fairbanks-Morse Co. direct reversible diesel engine fitted for double end drive, with a Kingsbury thrust bearing. The speed of the vessel will be 10½ knots. Two large fuel oil tanks of 2500 gallons capacity each will be located in end holds, behind the engine room bulk heads. The engine room, about 46 feet long, will be roomy and comfortable. Two 30 kilowatt generators will supply sufficient current for power and lighting. These, with the starting-air flashes, switchboard, storeroom and work bench will be on one side; and the necessary fuel oil, fire, bilge, general service and other pumps together with coal bin and hot water heater on the other side of the vessel.

The superstructure has been carried as far toward the ends as possible, thus giving an appearance of length and good proportion to the main hull.

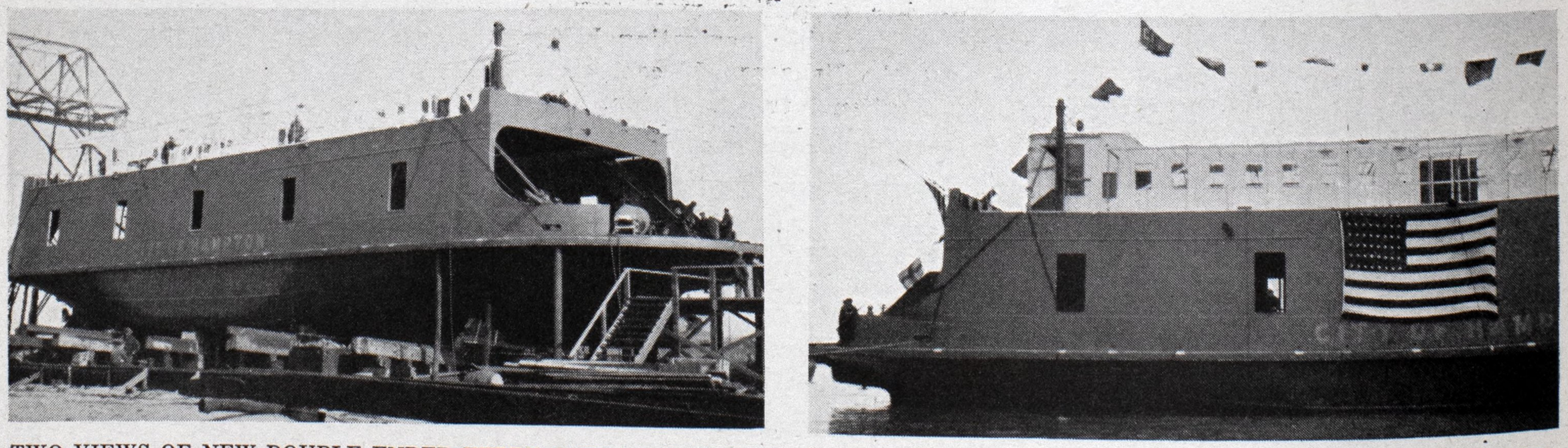
The main steel deck is to be covered with 3-inch wood block pavement, and two driveways on each side, the inner being specially wide for trucks, will allow a carrying space for 40 automobiles on each trip. By using tie-rods under the upper deck beams and a steel box girder from ends of the engine casing to the deep web frames at ends of the deck, all deck stanchions have been eliminated from the auto spaces thus making it easy for the handling and compact stowage of cars which is an important factor.

Wide, main stairways with an easy rise, at each end of the boat, give access to the upper deck. The design of the details shows where experience of the ferry officials has been combined with the shipbuilders to give to the traveling public pleasant and comfortable quarters for the brief trip from one Virginia shore to the other. The steel beams of the upper deck carry a stiff wood deck on which the deck house runs from near the ends of the superstructure.

Outside the wide passageway between rail and house allow spacious capacity on comfortable, roomy seats. The outside steel wire net railing is carried below a strong wood rail, down to within three inches of the deck, thus preventing loss of small articles and insuring entire safety to children while at play. The light wood deck above is carried to the rail to give shelter from sun or rain.

Bright electric lighting in the auto space and outside deck above, with dome lights in the cabin at night will illuminate every part of the passenger spaces. Special lights at head of each stairway and also part way down will make their use as easy as by daylight.

For the use of the captain, engineer and crew, four staterooms have been arranged directly behind the pilot



TWO VIEWS OF NEW DOUBLE ENDED FERRY CITY OF HAMPTON. LEFT—ON THE WAYS BEFORE LAUNCHING AND RIGHT—OVERBOARD—LAUNCHED ON SATURDAY, MARCH 8, AT THE MARYLAND DRY DOCK CO.

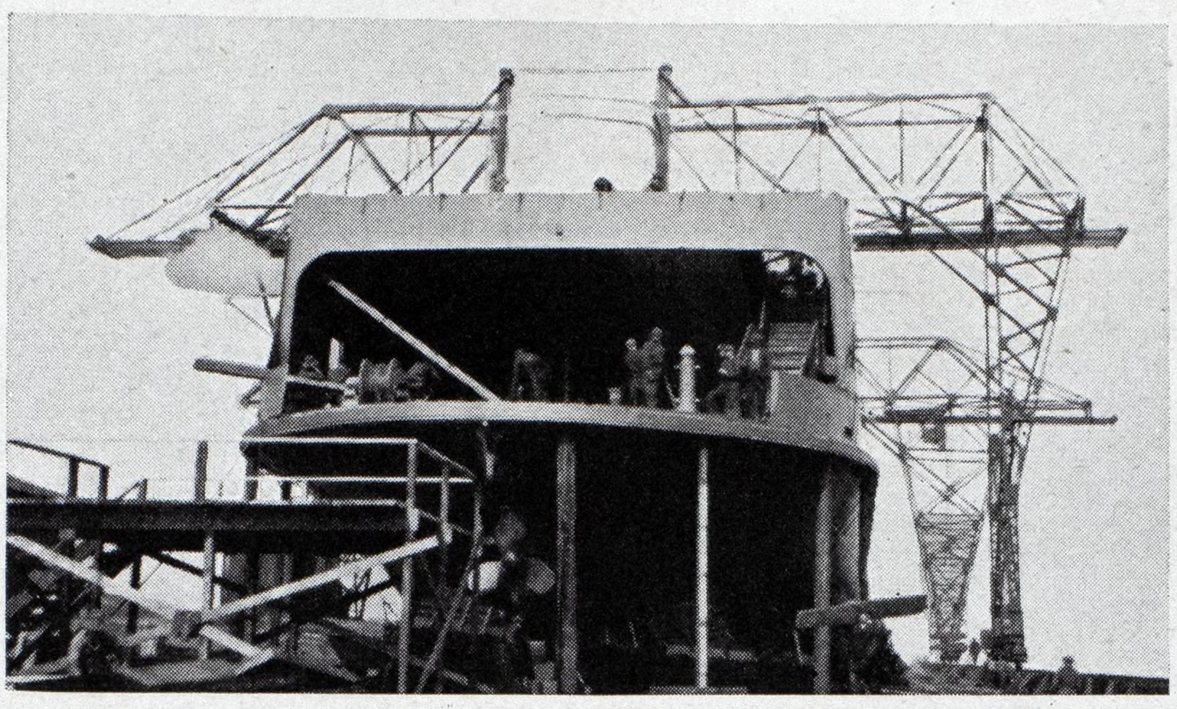
houses. With doors leading from the cabin, these rooms will be fitted with double berths, lockers and outside window. Painted a glossy white with small curtains over the windows and linoleum on the deck, they will be snug and warm in the winter and cool and comfortable in hot summer nights.

Because of the wide sweep and vision needed for harbor navigation, the pilot houses have received particular care and thought on the part of both the owners and shipbuilders. Realizing that ocean requirements, with a masthead lookout, an officer on the bridge, as well as others in the wheelhouse, are different from the conditions so frequently met in harbor work, when so often the "traffic" is thick, as well as the weather, the ordinary box-like framing between the windows has been avoided and in place of this thick, wide obstruction, the windows have only brass pipe guards, giving perfect support and stiffness, yet allowing an almost unbroken line of sight around the space ahead. An electrically operated engine in the hold is controlled by a large mahogany steering wheel, which can be transferred into a hand-operated steerer on short notice when desired.

Two complete sets of engine room bells, gongs, etc., in each pilot house preclude any trouble due to breakage of a part of the system. In order to allow a complete view of the auto deck, while docking, the wheel has been set ahead of the stand, instead of behind it, as is customary on ocean-going vessels, thus bringing the helmsman as close to the front windows as possible. A large brass hot water coil assures a warm house in winter and the natural oak of the walls with light green deck head gives a pleasing finish.

On the hurricane deck, two large metal lifeboats provide ample capacity in an emergency, two fire hose on each of the three decks will reach any portion of the vessel in case of fire. Wood crates hanging from the deck, at each end of the engine casing will contain life preservers, which may be easily reached by auto drivers on the main deck. An anchor, chain and davit at one end of the deck, with the customary mooring chocks and cleats complete the general equipment.

From the water-line the boot-topping of dark red will be carried to under side of guards, which will be black; and above the outside of the vehicle enclosure superstructure will be a dark green, similar to other ferryboats of the company. The deck and pilot houses will be buff, together with flag poles and deck fittings; the life boats and outside wire fence railing to be white. The main deck space, carrying the autos will be buff in color, while overhead, on the steel bulwark across the end of the upper deck, the passengers, when coming on board, will see attractively painted panels on each side of a painting of the company's house flag of dark blue, carrying in white letters the initials "C. F. Co." for the Chesapeake Ferry Co.



THE FERRY CITY OF HAMPTON ON THE WAYS AT THE PLANT OF THE MARYLAND DRY DOCK CO. AT BALTIMORE

Expand Soviet Shipyard at Vladivostok

By W. C. Rogers

IN THE five year plan, which governs all activities in the Union of Socialist Soviet Republics, is included an ambitious marine program and the construction of a shipyard at Vladivostok is not the least feature of this. While the Russian government is purchasing today a merchant fleet, chiefly of old shipping board vessels from this country for immediate use, by 1933 it will be possible to construct ships of any size and type at this yard.

Before the World war about 2500 men were employed in the shipbuilding plant in Vladivostok. During and after the days of the revolution the number fell to a repair gang of about 150; today 3000 men and women are employed. Running at full capacity in 1933, 7000 workers will be needed. Even more forcefully than these figures a visit to the yard reveals the surprising progress made and gives an impressive indication of what may be expected in the future.

A young communist announced before entering the shops that the Union of Socialist Soviet Republics needed no more machines—only machine making machines and that it could make even now many of these. A large steam hammer was being installed in the blacksmith shop and ordinary small work was in progress at about five fires. Arrangements for a new apprenticeship course in this trade were under way and new showers and locker room were installed.

Modern Machine Shop Methods

The machine shop differed in no marked respect from a good one in the United States. The new lathes were operated by independent motors but the old ones and some of the drill presses were driven from the usual belt. All machines were in very good condition, the store room was in order, and the shop clean. The workers, men and women, boys and girls, seemed conscientious and competent. A first class machinist was cutting teeth on a small gear—generally considered a pretty difficult job—and doing it well. Several women were at lathes and two were operating a thread cutting machine; another was overhauling a large planer. A couple of girls were filing away at a small casting and two more, in caps and dirty overalls, were working around the store room.

Along one side of the shop were eight large steam winches in different stages of construction for two vessels of the lake type which had been brought over from the Columbia river fleet. The completed one looked like a good serviceable winch and it was explained proudly that all parts of all had been made in the yard.

In the yard were four tug boats on the ways, all with high bows for ice. They will be diesel powered and are the first work besides repair work turned out. There were also six

(*Continued on Page* 110)

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

WHERE a vessel carrying a cargo of iron ore stranded, necessitating the jettisoning of a large part of the cargo, and thereafter the vessel took on a new cargo of cork for the purpose, not only of increasing freight, but also to make the ship more seaworthy, the value of the ship during the time lost and extra travel made necessary by procuring the cork was not a proper deduction from the freight on the cork, which was sought to be offset against the freight lost on the certificate of insurance to recover for jettisoned iron ore, in an action on a loss of freight on the jettisoned iron ore.— New York & Oriental Steamship Co. v. Automobile Insurance Co., 32 F. (2d) 310.

* * *

ONE who contracts to unload lumber from a steamship and to unload it on dock is a bailee for hire, and as such is not an insurer, but is liable only for negligence.—Robert R. Sizer & Co. v. Chiarello Bros., Inc., 32 F. (2d) 333.

* * *

WHERE the owner of a scow which sank in a channel complied with the law by notifying the lighthouse department to mark the wreck, he was rightly freed from any liability for damages to a vessel subsequently colliding with the submerged scow.—New York Marine Co. V. Mulligan, 31 F. (2d) 532.

* * *

THE United States, suing to recover for injury to a ship, while it was being operated in foreign commerce, was immune from the defense of laches, whether in operating the ship it was exercising a war power or power to regulate or carry on foreign commerce or whether it was seeking to recover pecuniary loss suffered to property, in its lawful ownership. However, the United States suing to recover damages for the account of the owners of the cargo, who were private persons, has no immunity from laches. —United States V. Alex Dussel Iron Works, 31 F. (2d) 535.

* * *

IN THE case of Centrosoyus-America Inc., V. United States, 31 F. (2d) 610, the court decided that if ambiguities and inconsistencies in shipping documents can be avoided by construing words of art in the sense in which the parties apparently used them, such construction should be employed. The court said: "I cannot believe that shipping men, more than any others, always use works of art with a keen appreciation of the breadth or narrowness of meaning that courts have ascribed to them in particular documents in which, under other and different states of facts, a judical construction of particular words has been required. A court's chief concern, when called upon to construe the phraseology of persons who have sought to express their own ideas, even though they have done so loosely, is to effectuate their real intention and purpose."

* * *

THE ship's lien upon cargo for general average is possessory only, and the master can enforce it only by retaining the goods.—Det Forenede Dampskibs Selskab v. Insurance Co. of North America, 31 F. (2d) 658.

* * *

ENGAGEMENT of a tug to take steamers through a canal is ordinarily considered as a pilotage, and requires the tug to pursue a proper course leading the way safely through the canal, though assisted by the steamship. The tug was bound to know the channel, its width, depth, and obstructions, having in mind the draft of the boat she was towing, the presence and fueling of another boat at a dock, together with the manner in which she and the fuel scow were lying, and the space they occupied. If there was uncertainty in the mind of the master of the tug as to safe passage, he should wait or give notice or warning of his uncertainty, so that either the scow might be moved, or other steps taken to ease the situation. —GEORGIA, 31 F. (2d) 759.

* * *

IT IS the settled rule in federal courts that, where the fault of one of two colliding vessels is clear, no case of divided damages arises unless it is shown with equal clearness that the other vessel was also at fault.— Pool Shipping Co. v. United States, 31 F. (2d) 806.

* * *

UNDER a charter requiring a vessel to proceed to the loading point "or as near thereunto as she may safely get (always afloat)," it was held in the case of United States v. Atlantic Refining Co., 33 F. (2d) 366, that notice of arrival and readiness to load so as to the running of lay days was not warranted where the vessel anchored off bar 3½ miles from shore in an open roadstead without shelter from the sea. The court said: "In the absence of express agreement to that effect, a vessel cannot be held to have arrived at a loading or at a discharging port, 'or as near thereunto as she can safely get,' when lying in an open roadstead where cargo is not customarily laden or discharged, and where it is obviously unsafe to attempt such an operation, for this would be to imply agreement inconsistent with the mutual obligations of the parties. It would be most unreasonable to imply agreement that the charterer would be responsible for delay in loading the vessel before she had come to a place where the freight could be safely put on board. Readiness to load implies ability to safely receive the cargo, if other words do not destroy the implication. If in the preparation of commercial contracts the parties leave to implication the limitations which they must have intended should control the generality of such language as the clause here under consideration, the courts must assume that they intended to agree upon what was fair and practical in a commercial sense, with a view to the accomplishment of the business on foot."

* * *

A STEVEDORE, 46 years of age, married, suffered a fracture of both bones of his right forearm. His injuries were of a permanent nature, which unfitted him for efficiently performing his duties as a stevedore, save to drive winches. He suffered greatly for the first several weeks of his injury, and his arm continued stiff and weak some 15 months after the accident. At the time of the injury he earned an average of $35 a week. He was totally disabled 44 weeks, occasioning a loss of $1540 in wages, and his doctor's bill was $60. It was held, in the case of Fauntleroy v Argonaut Steamship line, Inc., 31 F. (2d) 941, that an award of damages in the sum of $2000 was insufficient, and the court increased it to $3000.

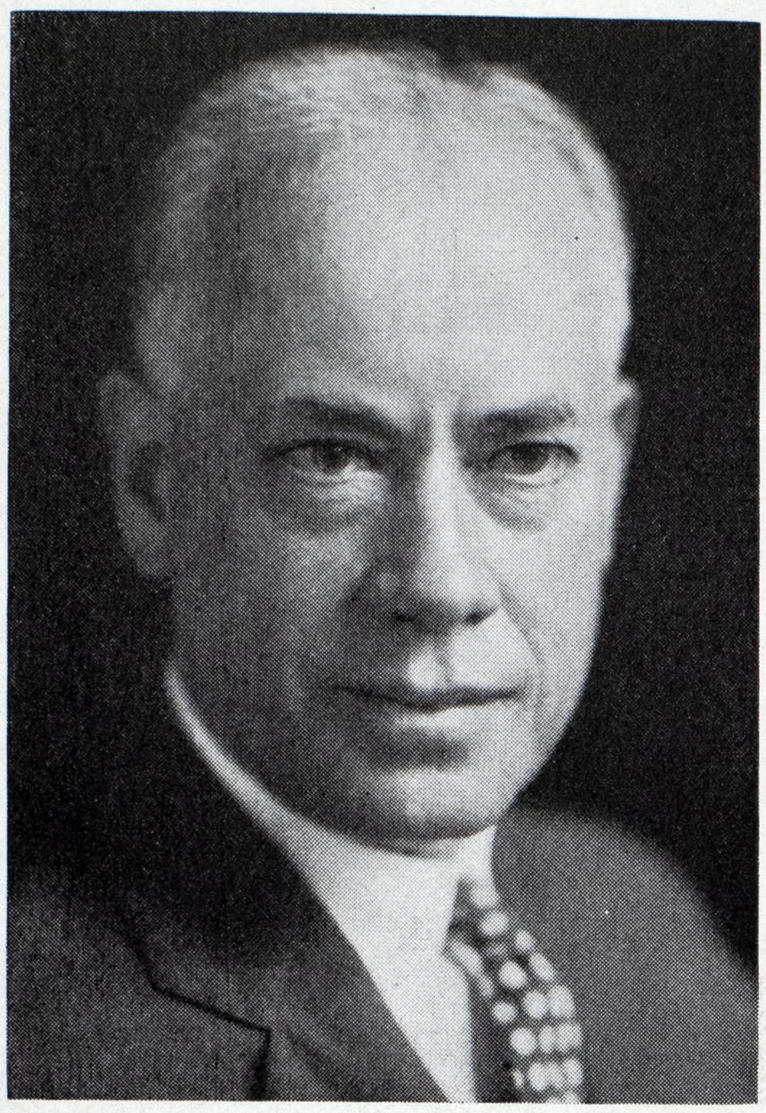
* * *

THE purpose of requiring a vessel to take a pilot, said the court in the case of Dampskibsselskabet Atalanta A/S v. United States, 31 F. (2d) 961, is to have her in charge of a competent person, familiar with particular waters. When on board he is temporarily in charge of her whole navigation, including the duty of determining her course and speed, and the time, place, and manner of anchoring her. The master is not entirely absolved of responsibility when a pilot is in charge, but before he is justified in displacing him he should be sure that the pilot is for some reason incompetent.

* * *

AS IN collision, so in towing, a vessel does not, of course, become liable for all damage arising from her navigation or unfitness; she is not an insurer, and the injured party must establish some fault through neglect or affirmative misconduct.—Cranberry Creek Coal Co. v. Red Star Towing & Transportation Co., 33 F. (2d) 272.

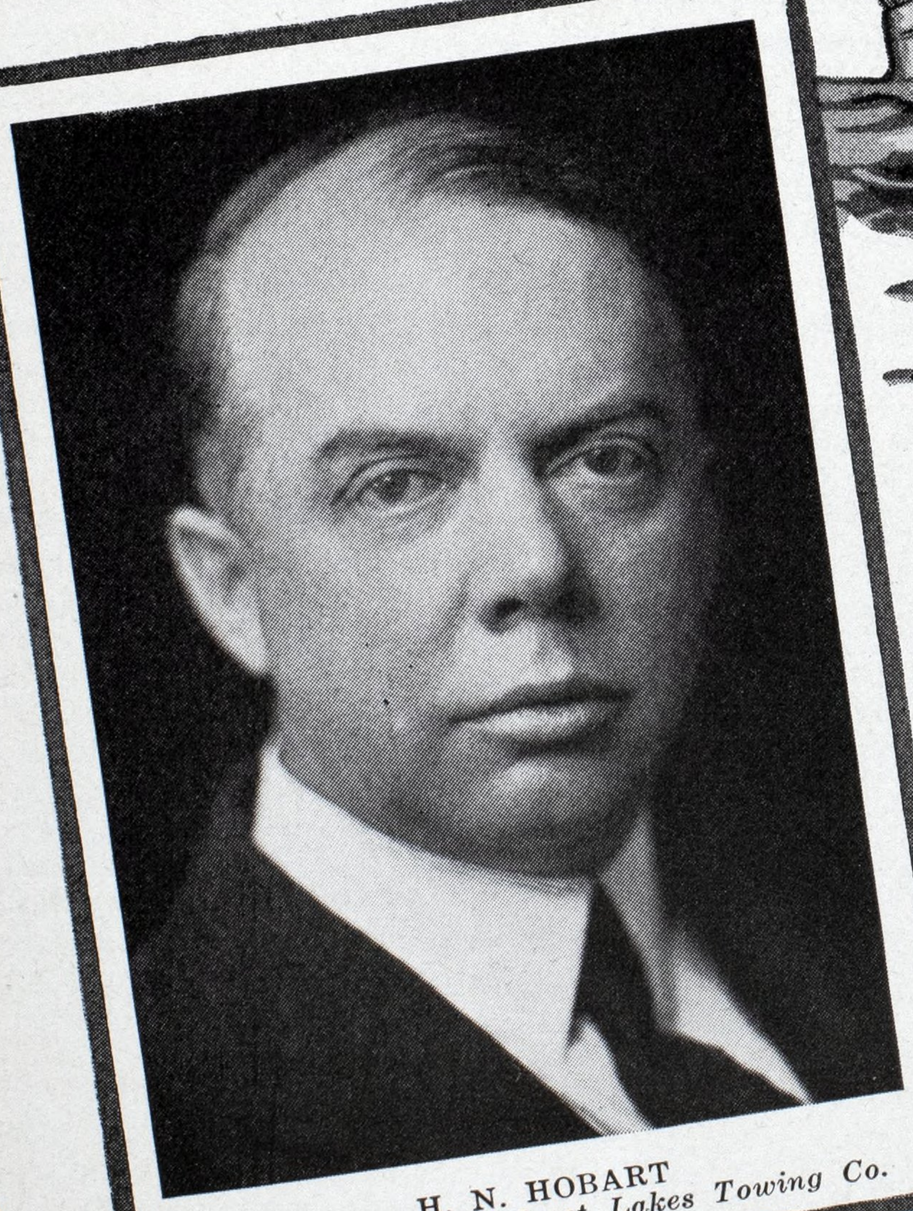
MEN *of* MARINE AFFAIRS



THEODORE BOWKER
New York & Cuba Steamship Co.



IRA A. CAMPBELL
Admiralty Lawyer

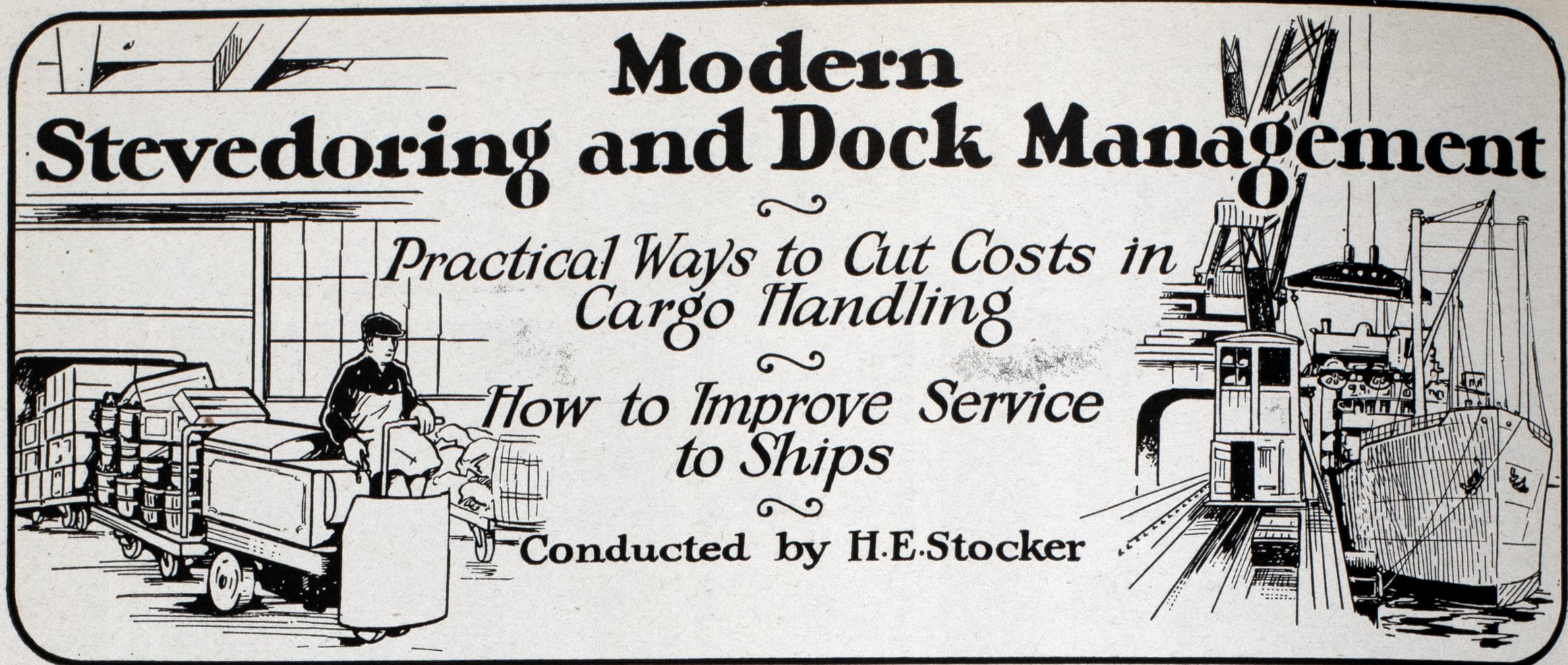


H. N. HOBART
Assistant to Pres. Great Lakes Towing Co.



FRANK C. OAKES
Franklin Steamship Co.

Photos by Blank-Stoller, Inc.



High Cost of Handling is Reduced By Proper Control of Methods

By By H. E. Stocker

ALL unnecessary handling of cargo is expensive whether it is putting down and picking up, hauling longer distances than is necessary or whether it is using a less efficient method for handling cargo than is available.

The first principle to be followed is not to handle cargo at all if it can be avoided. Second, if cargo must be handled, handle it mechanically. Handling mechanically improves the net results by making possible the handling of cargo in heavier units. For example, a man working with a hand lift truck can lift from 5000 pounds to 10,000 pounds as compared with 200 pounds or 300 pounds when he works without the aid of the lift truck. Also mechanical handling makes possible faster horizontal handling or hauling. A man travels approximately one-tenth of a mile an hour with a two wheel hand truck; a tractor or lift truck travels between three to fifteen miles an hour.

Piling, tiering, or other vertical handling can be done more economically working with mechanical equipment than by hand labor alone. Portable elevators, stackers, cranes and hoists handle heavier loads and handle the loads faster. Four men working with a stacker can pile hogsheads of tobacco. Without the stacker seven men are needed and they take longer to do the work.



Tractor Moving Three Trailers Loaded with Bags of Sugar at the Clyde Steamship Co.'s Warehouse, Charleston, S. C.

Many examples of waste caused by unnecessary handling or because a less efficient method is used are found on marine and railroad terminals and in various industries. The problems and their solution are fundamentally the same whether the material to be handled is found in an automobile factory or on a steamship pier.

This article will describe briefly examples of unnecessary handling, describe how this waste has been eliminated, point out wasteful methods that have been used on marine terminals throughout the country and offer suggestions to properly change these methods.

How Handling Was Reduced

The Milwaukee railroad stores department formerly loaded brake shoes by hand. The brake shoes were picked off the floor and placed in a wheelbarrow in units of 15, hauled 200 feet

and placed in a box car. The loaded car was switched to a storage point, where the brake shoes were unloaded and placed in stock. This operation was repeated when loading for outside points and at destination, the brake shoes were again removed from the car one at a time and placed in a wheelbarrow to be handled in units of 15. It required one man 40 minutes to handle 15 brake shoes.

The stores department now uses skids and power lift trucks for handling the brake shoes. On a continuous operation, one man with a power lift truck performs in one hour what it took one man without mechanical equipment, 53 hours to perform. Operating with a power lift truck and skids, 150 brake shoes are placed directly in skids at the foundry, and with each handling operation a unit of 150 brake shoes are moved. After the brake shoes are once placed in the skid, the unit is 150 brake shoes for each handling as compared with one brake shoe under the old method. Handlings are reduced by the new method of handling from 150 to one.

Many other commodities are handled with the skids and lift trucks as well as by means of tractors and trailers and skids and lift trucks combined. All of these operations have shown definitely, the wastefulness of the old methods of handling materials and have suggested to other industries methods of reducing costs and damage to materials by the use of mechanical equipment.

The remarkable results achieved by the stores department of the Milwaukee railroad have had a big influence on the movement for through shipping of freight on skids. This movement has recently culminated in the organization of a company to rent skids so that the advantages of skid shipping may be widely extended.

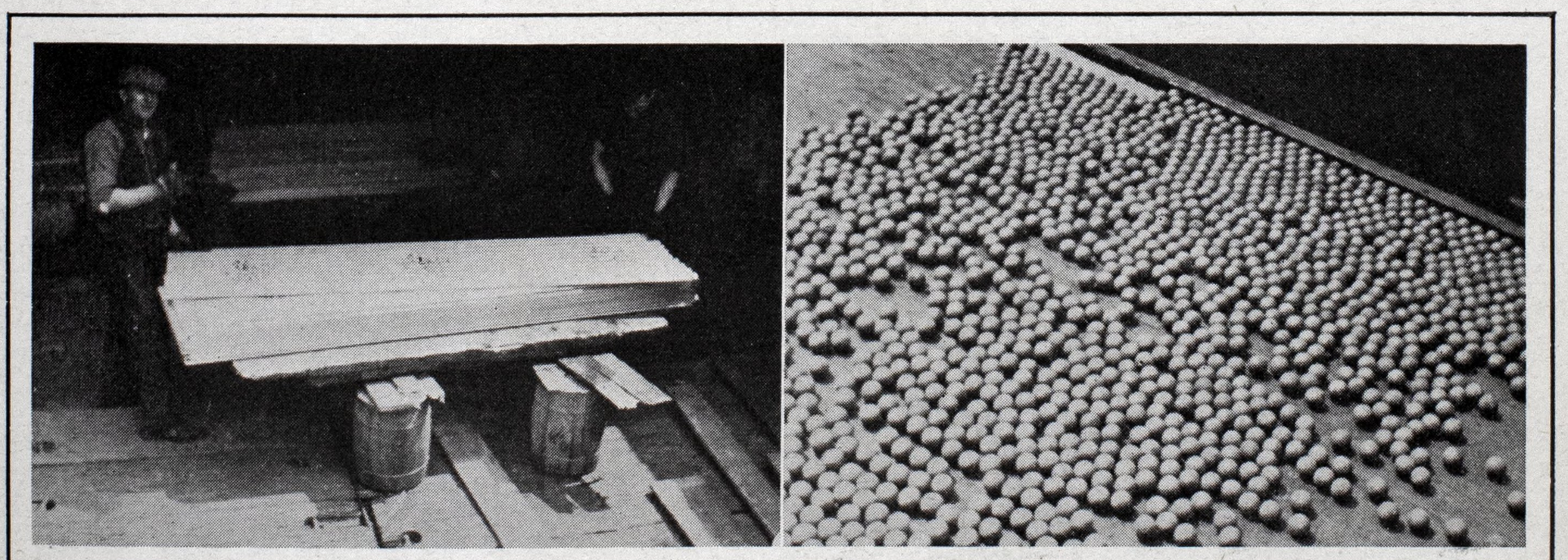


Tractors and Trailers Reduced Handling Costs for This Line

The adoption of this skid method by a shipping company resulted in the reduction of stevedoring cost 60 per cent, in handling one commodity because a unit of 3000 pounds was handled instead of hundreds of small pieces weighing only a few pounds each.

The same idea was adopted recently by a fire brick manufacturer for export shipments. Formerly he shipped bricks in units of 50 pounds each and either covered each unit with fibre and steel, strapped it, or packed the unit in a wooden box. Now unit loads of 500 bricks are placed on a non-returnable skid. The brick is then covered with a fibre covering and securely strapped to the skid. The skid complete costs $3.40. The net saving to the brick company over the old method is $5 to $6 per 1000 bricks. The steamship line cut its stevedoring expense because a unit of 500 bricks was handled instead of a unit of from ten to 30 bricks. In addition, these shipments are delivered in better condition. The space lost between the floor of the skid and the deck of the ship is offset by the space saved because of the compact packing of the brick as compared to the use of numerous cases or packages and also because of the reduction of handling and damage to the brick.

Recently, the author saw a carload of blocks of salt handled from car to ship. These blocks were picked up by hand in the car and placed on a two wheel hand truck. The load was then trucked to a place of rest on the dock and there piled. Later in the day the salt was again picked up and trucked into the ship. At destination the salt is unloaded and loaded into cars. All together there are eight handlings.



Left—Re-handling Galvanized Sheets in the 'Tweendeck—Shipping on Skids Avoids This Handling of Many Sheets.
Right—Shipping Grinding Balls in This Manner Makes a Difficult Problem in Handling



In This Instance the Shipper Aids the Carrier in Reducing Handling by Arranging a Number of Cases Together

Shippers complain bitterly of the chipping of the blocks. In addition to the damage, the numerous handlings are uneconomical and a passenger ship is delayed. If the salt were packed on skids when taken out of the car and allowed to remain on the skids until loaded into cars at destination, six handlings would be eliminated—and all of the damage.

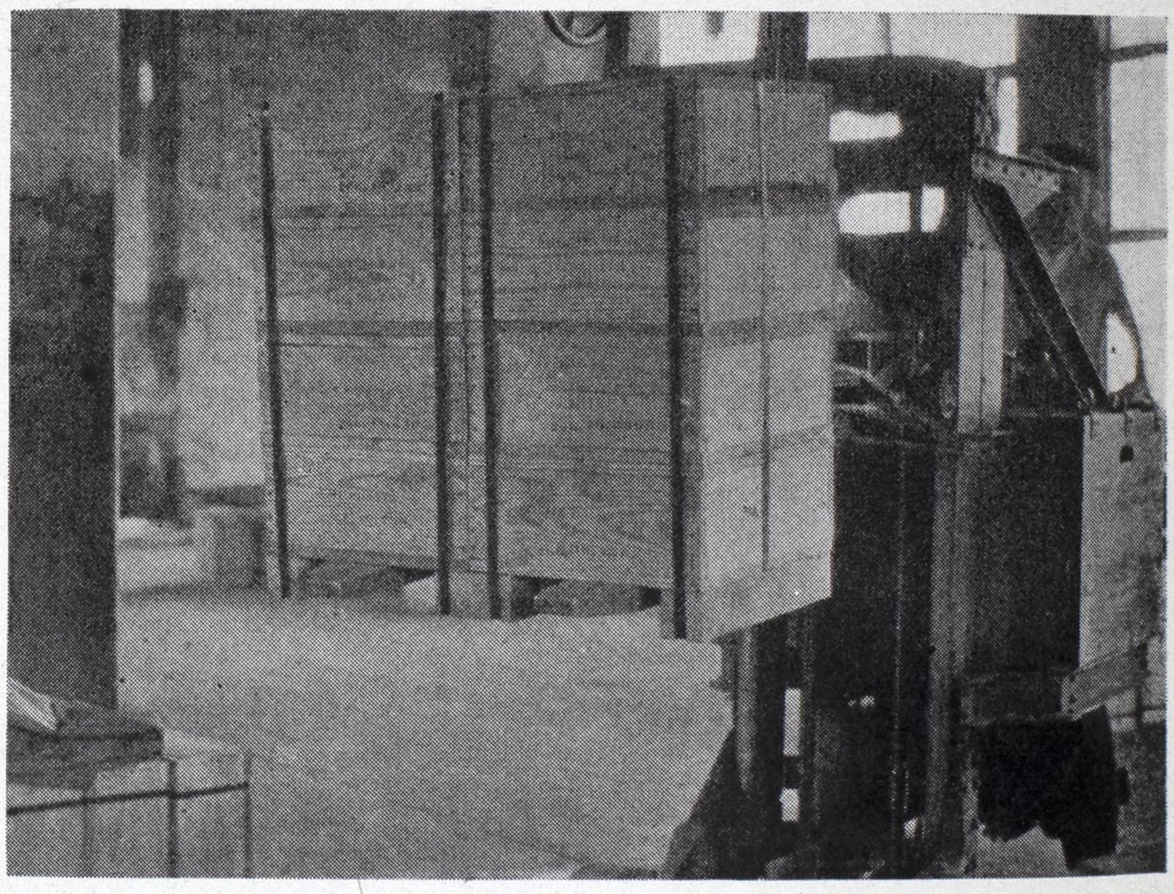
Skids are used by the Eastern Steamship Co. for handling packages of magazines and small packages of tea between terminals. The skids are handled with hand lift trucks which are hauled by a gasoline or an electric tractor.

The handling of lumber is expensive because of the numerous small pieces to be handled and because of various grades. Recently one terminal found an additional cost of 75 cents per 1000 feet because the lumber was taken from ship to dock and later from dock to car. When direct car loading is not possible this handling waste can be avoided by the use of skids, which method has been tried and found successful. In the February issue of MARINE REVIEW, the use of unit loads of lumber handled by special equipment is described in some detail.

The use of skids and lift trucks for reducing handling costs in interchanging freight between the New York Central railroad and steamship lines at the port of New York was described in the April, 1929 issue by Mr. Shaffer, assistant manager of the marine department of the New York Central. The extension of this practice to other railroads would help materially in eliminating wasteful handlings. Recently a carload of forgings of uniform size and weight came alongside a steamer on a railroad lighter. The railroad gang had laboriously carried these heavy pieces piece by piece to the lighter. The stevedores laboriously picked them up piece by piece and trucked them to the lighter hatch, and piece by piece they were handled from the sling to stowage. There were 868 forgings, making an aggregate of 2604 handlings. If the New York Central practice had been followed, these forgings would have been placed on skids by the railroad gang and would have remained on the skids until unloaded in the hold.

A survey of marine terminals throughout this country and Canada discloses a large amount of unnecessary handling because of the lack of modern equipment or because of its ineffective use. On one pier, the author saw a truck load of rivets in kegs unloaded to the dock floor by the driver and a helper. Less than half an hour later, these kegs, three at a time, were picked up by stevedores using two wheel hand trucks and moved into the ship. Following the methods proved practical elsewhere skids, trailers or similar equipment could have been used for the receipt of the rivets instead of the dock floor. If this equipment had been used a handling would have been avoided, the unit load would have been increased from 300 pounds to 2000 pounds, the cost of loading would have been decreased, and the ship's time saved.

Numerous handling of thousands of small cases is another example of wasteful methods. In one instance truckloads of small cartons were unloaded to the floor of the dock in the morning and in the afternoon were carried by the stevedores, a few cases at a time, into the ship.



Avoidance of Handling Cases at Ship's Side is a Simple Way to Eliminate Waste



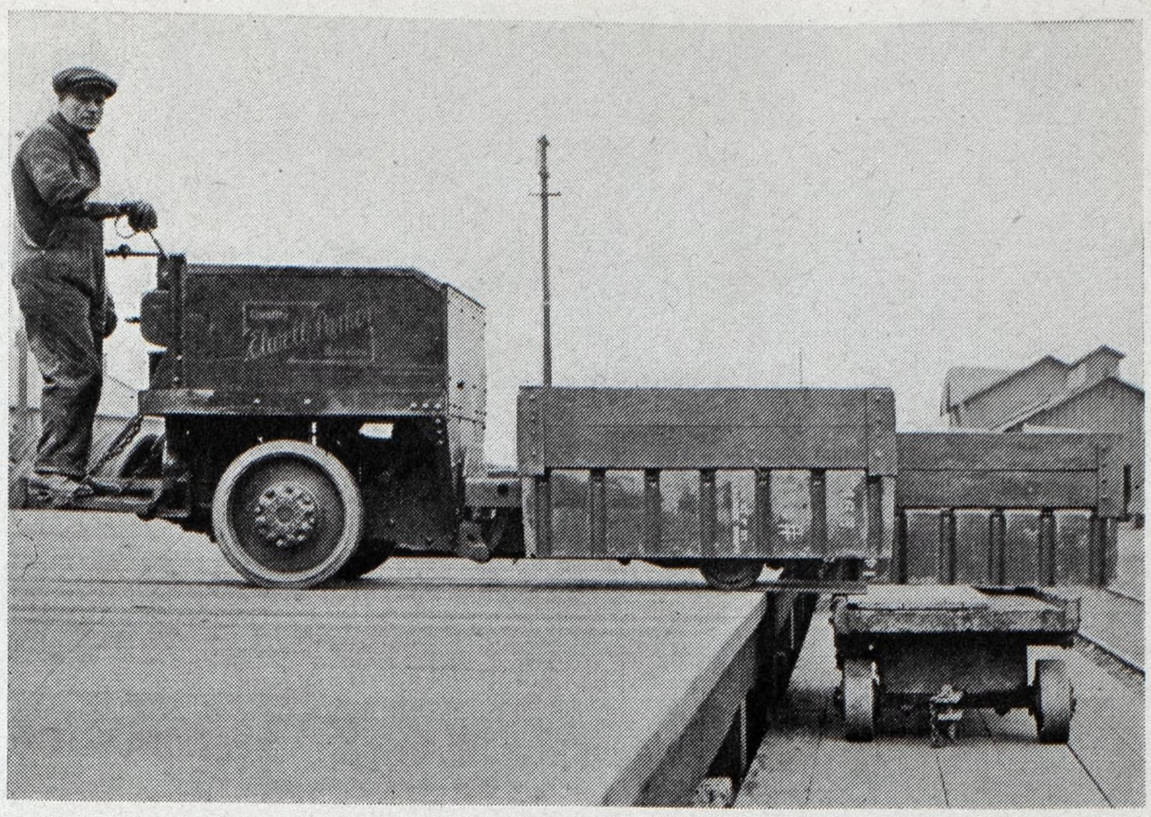
Piece by Piece Handling is Expensive—Can be Avoided by Proper Cooperation with Shippers

A shipment of 2850 cases, weighing 13 pounds each and measuring 8 x 7 x 7½ inches, was handled 12 times from the factory to the warehouse at destination. There were 34,200 handlings. If this shipment had moved on skids, the handlings would have been reduced from 34,200 to 144. If the shipper will not use skids or other modern methods to avoid this waste, the transportation companies involved should do so.

The use of trailers to avoid handling, and to handle by mechanical means rather than by hand, was described in the February, 1929, issue. That article told how the Goodrich Transit Co. cut cargo handling costs 50 per cent by keeping approximately 40 per cent of its cargo on trailers while in transit between ports. This same method was recently adopted by a Chesapeake Bay line.

Re-handling of freight at a 'tween-deck hatch of a side port vessel is another example of unnecessary handling. Recently the author saw a longshoreman with a truck equipped with ReBo bring cases from the dock, through the side port to the 'tween-deck hatch. There every package was taken off the ReBo and placed on a sling. This type of wasteful handling has been avoided by the Merchants and Miners Transportation Co. by the building of a simple sling that permits slinging the ReBo of Truk Pak into the hatch. The empties are passed up by hand.

An intercoastal line increased its tons per hatch hour by slinging trailers into the ship instead of loading the cargo onto an airplane or platform type of sling.



The Milwaukee Railroad Reduces Handling by Use of Skids and Lift Trucks

In the October issue the Barlow elevator was described and figures given of the performance of skids and lift trucks using this elevator to avoid steep gangplanks. It will be recalled that in one case 135 tons were handled in 59 minutes using three men, two lift trucks and a fleet of skids. In another operation, 90 tons per man hour were handled with a haul of 300 to 400 feet. These results were possible because the freight was kept on skids in the vessel and the skids were handled by power lift trucks assisted by the elevator.

An excellent example of wasteful handling was seen on a river terminal Nineteen men were used to drag large steel tank plates off of a flat car, across the dock and through the side port of a ship. This work could have been done by four or five men if a tractor had been used as tractors are used for jobs of this character on other terminals and in factories.

Another example of the high cost of handling is found in handling freight from railroad lighter to dock and thence into the ship, instead of loading directly into the ship. In one operation 70 cents a ton was saved by avoiding this extra handling.

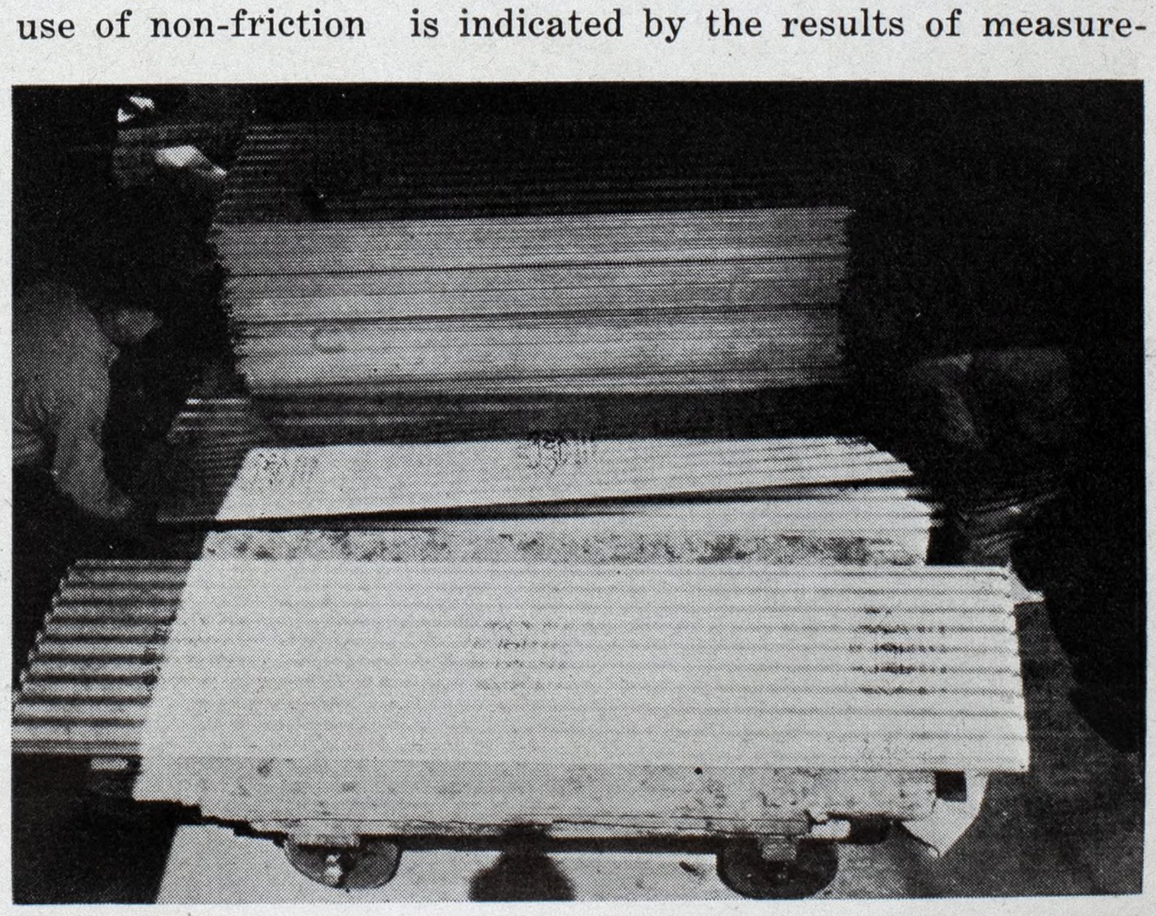
A cement company reduced handling costs in handling cement from barges to storage by means of an electric tramrail, of a type which is used extensively in manufacturing plants. Formerly when hand trucks were used supplemented by motor trucks, 15 to 19 men were needed to unload a barge. Using the tramrail, only seven men are needed because several handlings are eliminated and heavier units are handled. Space is saved because with the tramrail the cement can be piled higher, and the barges are turned around in half the time. In addition to these benefits, the motor trucks that take the cement to jobs are loaded in much less time.

Obsolete Equipment Reduces Earnings

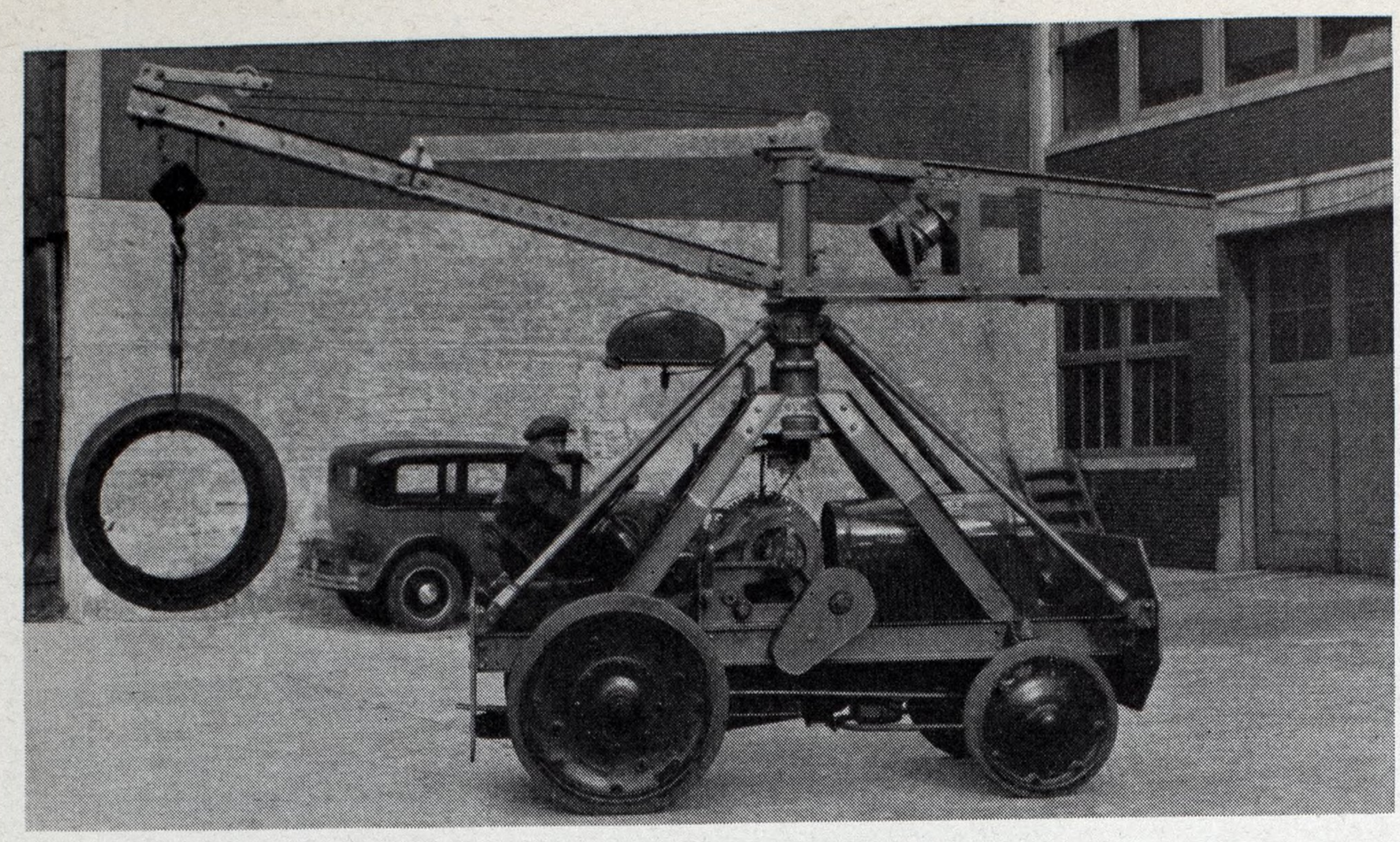
OBSOLESCENCE is a drain on profits and therefore is considered a factor in the management of all well managed companies. Obsolete equipment and methods on a terminal are the result, usually, of incomplete knowledge of the methods and equipment available.

Steamship lines operating only with two-wheel hand trucks, are operating with obsolete equipment. Engineers have developed tractors and trailers and skids and lift trucks which have proved capable of cutting cargo handling cost under varying conditions. The company that saved $80,000 a year by the installation of a tractor trailer plan of operation, for years prior to the purchase of this equipment, was being taxed $80,000 a year by absolescence.

Trucks and trailers without roller or ball bearings and without rubber tires are obsolete. Engineering data are not available to illustrate the savings effected by the use of non-friction bearings and rubber tires on trucks and on trailers, however, that there are savings and that they are large is indicated by the results of measure-



Man Handling Freight in This Manner is Obsolete. In Many Instances Mechanical Handling Can be Used to Advantage



AN EFFICIENT FLEXIBLE TYPE OF CRANE FOR MECHANICAL HANDLING

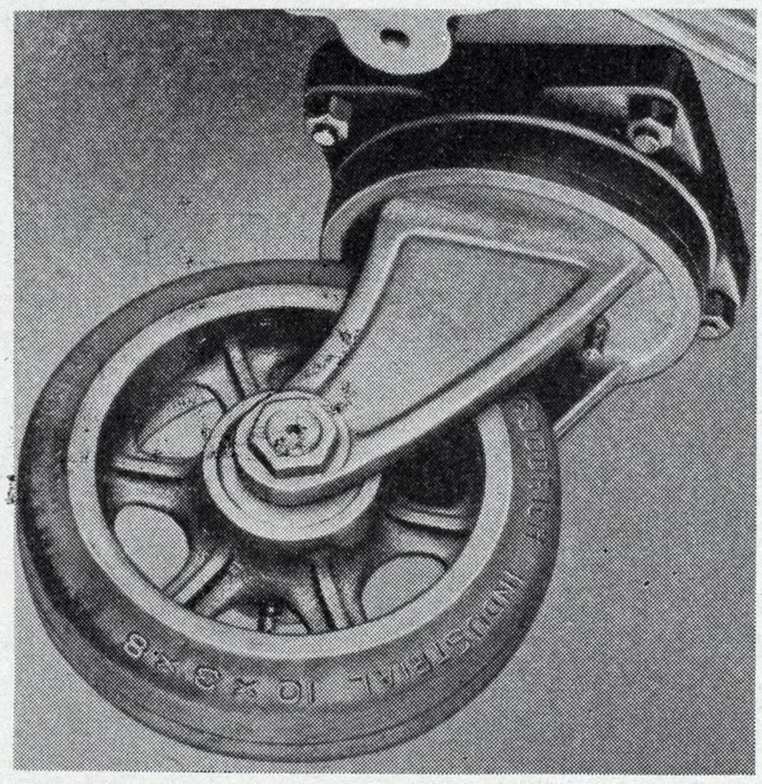
ments which have been made elsewhere.

A 46 per cent power saving resulted from equipping rolling mills in a steel plant with roller bearings. Similar bearings on railroad cars cut the power necessary to move them, 88 per cent.

Modern American management realizes that anything that reduces *fatigue* is good business. Ignoring the other savings, this alone justifies non-friction bearings. Good tools are essential to good workmanship economically performed.

The cost per ton of freight handled is the test of obsolescence. A stevedore found that his competitor underbid him $1 a ton on cork contracts. Investigation disclosed that his own equipment was obsolete because new equipment had been developed that cut costs to such an extent that the competitive price was possible.

A newly developed lead battery, recently placed on the market, is said to give 43 per cent greater capacity for the same square footage of battery compartment. This battery makes batteries which still have many months of useful life obsolete because under certain conditions, the new battery increases the usefulness of a truck or a tractor beyond what it is normally.



CLOSE UP OF A CASTER ON A MODERN TRAILER

Within a month or two a new development in material handling equipment will be placed on the market which will immediately make obsolete equipment now handling work economically. The present equipment is producing a profit. When the new equipment comes on the market the present equipment will still be producing a profit, but it will not be producing the maximum profit because the new equipment has been invented to do a better job. It will then pay to junk some equipment now operating successfully because the new equipment will cut costs enough to make junking profitable.

One of the dangers of obsolete equipment is that it is not brought sharply to the management's attention. The wearing out of equipment is brought sharply to the management's attention by noise or breakdown, but to avoid the use of obsolete equipment and methods, requires a diligent search for information about new equipment and modern methods.

Salesmen of equipment manufacturers perform a good service in bringing new equipment and methods to the attention of stevedores and shipping executives. This source of information, however, is not sufficient in itself. Although contacts were made with all salesmen, the knowledge gained would cover only equipment produced by outside equipment manufacturers. Many important cost reducing and service improving pieces of equipment are developed by men in the shipping business and are manufactured in their own shops.

While wideawake stevedores endeavor to keep informed about new developments they make, usually, no systematic effort to get such information promptly and completely. The trade press is fast becoming a source of profitable information on new equipment and modern methods and their use at various terminals.

Another important source of profit making ideas and information is the consultant. He is in touch with developments of equipment not only in one or two ports but in ports all over the country and in foreign ports as well. He is also in touch with the developments in materials handling in other industries from which equipment and methods have been adopted for use in handling cargo and from which more ideas will be adopted in the future.

One of the chief characteristics of the consultant is his detached viewpoint. The executive is often too close to the operation to see its faults to which he is accustomed or which may be a reflection of his own mistakes. Another distinct characteristic of the good consultant is that he is constantly looking for different equipment and methods to cut costs and to improve service. That is his job.

(*Continued on Page* 118)



KEEPING THE CARGO ON WHEELS IS IN LINE WITH THE BEST PRACTICE TO REDUCE COST

Patents Show Marine Development

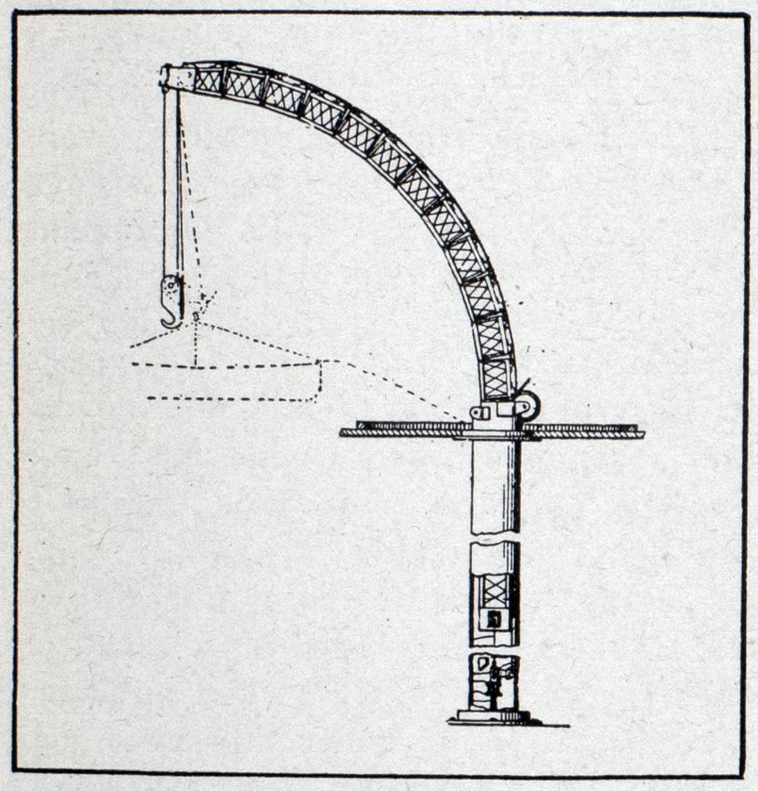
Latest Marine Inventions Described

Specially Prepared for Marine Review By Richards and Geier

Patent Attorneys, 274 Madison Avenue, New York

THIS invention relates to mechanism for rapidly and expeditiously handling life boats. It is aimed to provide a novel disappearing construction adapted to be carried by a vessel.

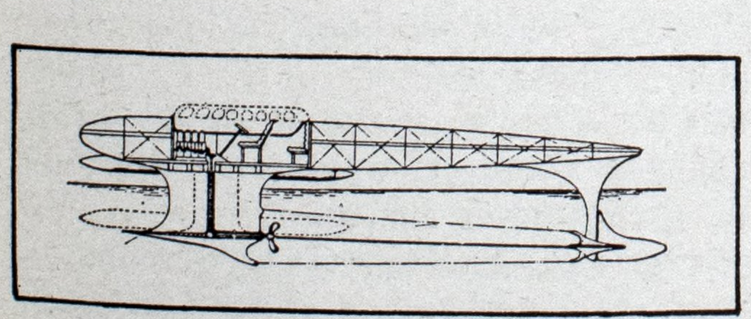
Another important object is to provide a construction wherein the casing is rotatable and mainly disposed below a deck and which has articulate sections adapted to be projected and substantially form an arc for better coaction with life boats and which sections are adapted to assume a straight line when in retracted or disappeared position.



LIFEBOAT-HANDLING MECHANISM

United States Patent No. 1,746,109 issued Feb. 4, 1930, to Lowi Edwards, of Boston, Massachusetts.

THIS invention relates to a navigating machine, the weight of which is supported by means of one or more otter boards fitted to the machine to keep the body of the machine above water level, while one or more propellers and otter boards are kept deep in water by means of a draft regulating device such as a horizontal rudder or rudders. The object of the invention is to provide a navigating machine in which all of the body, propellers and otter boards thereof are not affected by waves so that rolling and pitching of the machine are minimized.

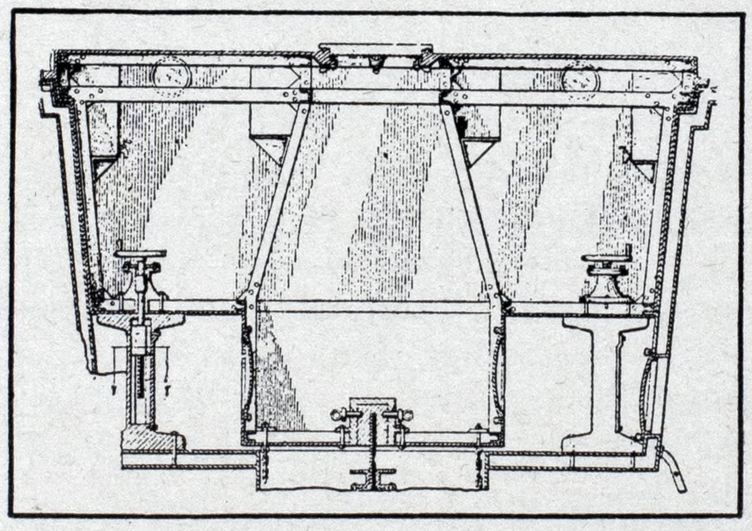


NAVIGATING MACHINE

United States Patent No. 1,736,896 issued Nov. 26, 1929, to Genkichi Yamanouchi, of Tokyo, Japan.

WE HAVE made arrangements with the patent attorneys, Richards & Geier to publish data relating to letters patent issued in the United States covering inventions which may be of particular interest to our readers. The patents described, some of which have accompanying cuts partially illustrating the inventions, are all of recent date and we are planning, in subsequent issues, to publish similar information on patents pertaining to various phases of marine development work. Should our readers be interested in obtaining a printed copy of any of the patents appearing in this issue, or any other patent desired, such copies may be had by addressing request to the editor or direct to the contributors of this page.

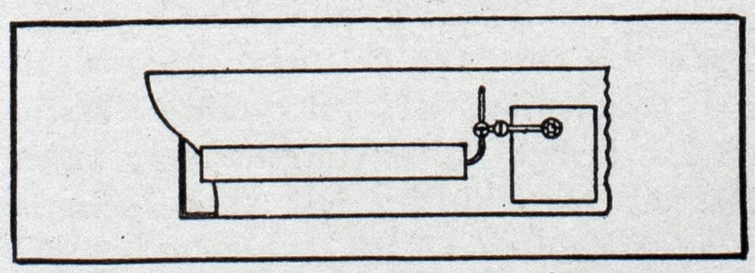
THIS invention relates to life saving apparatus particularly intended and adapted for use in connection with submarine vessels. The object of the invention is to provide means of escape from sunken vessels and for this purpose embodies the idea of and means for the utilization of a float or floats constituting a regular and established part of the equipment of the vessel.



LIFE-SAVING DEVICE FOR SUBMARINES

United States Patent No. 1,740,948 issued Dec. 24, 1929, to Frederick H. Lear, of South Amboy, New Jersey.

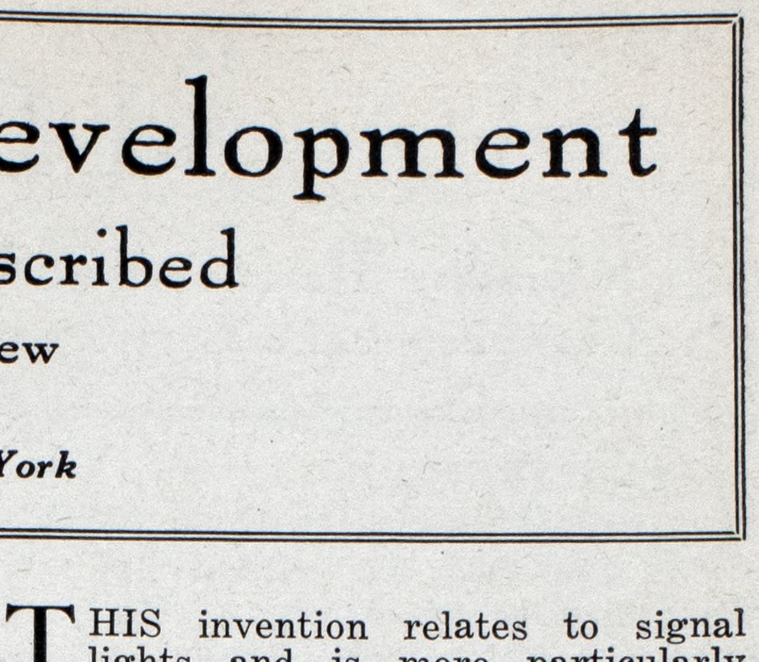
THIS invention relates to a new propelling mechanism for ships and it has for its object a better efficiency than that of the commonly used propelling by screw or paddle wheels.



SHIP'S PROPELLER

United States Patent No. 1,739,884 issued Dec. 17, 1929, to Friedrich Wiswedel, of Schlagenthin, Germany.

THIS invention relates to signal lights and is more particularly concerned with portable signal lights for marine use.

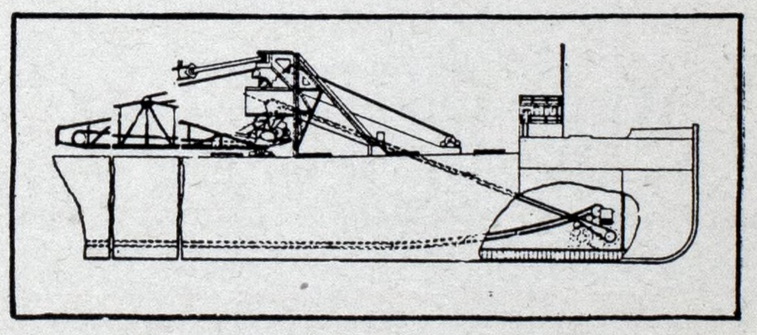


MARINE SIGNAL LIGHT

United States Patent No. 1,735,797 issued Nov. 12, 1929, to Louis T. Scott, of Seattle.

THIS invention relates to unloading booms for ships and turntable therefor.

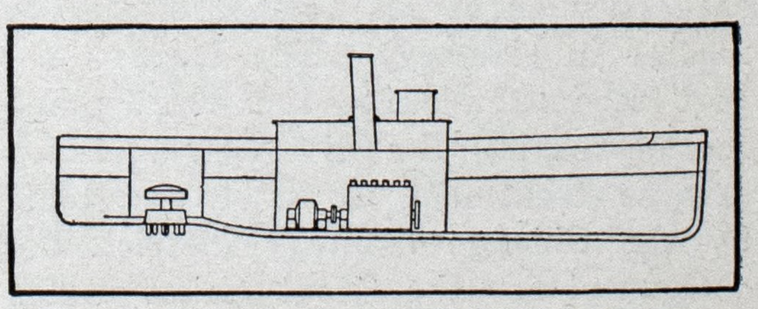
An object of the invention is to provide an unloading boom for ships which carries an endless belt conveyor in which the vertical space occupied by the boom and support is reduced to a minimum.



UNLOADING BOOM FOR SHIPS AND TURNTABLE THEREFOR

United States Patent No. 1,737,342 issued Nov. 26, 1929, to Jacob R. Sensibar, of Chicago, Ill.

THIS invention relates to the art of engine driven marine vessels. More particularly, this invention pertains to a new, improved engine driven vessel which results from the joint and co-operative action of a new propeller and new design of hull.



ENGINE-DRIVEN MARINE VESSEL

United States Patent No. 1,740,820 issued Dec. 24, 1929, to Kurt F. J. Kirsten, of Seattle, Wash., a corporation of Washington.

Up and Down the Great Lakes

Interstate Harbor—Water Diversion—Lake Levels—Launch Freighter—Radiobeacon Changes—Lake Carriers Report—Enormous Tonnage—Shipbuilding Company Reports

CONSTRUCTION of an interstate harbor on Lake Michigan at the Illinois-Indiana state line to serve as a grain port is being urged by various organizations in Chicago. It is suggested that the grain elevators on the Chicago river should be replaced with modern equipment on the lake front..

Maj. Rufus W. Putnam, former United States engineer at Chicago, addressing a recent "harbor forum" meeting of several Chicago organizations estimated that a new harbor, breakwater and elevators could be constructed at a cost of $10,000,000 to $12,000,000. He also suggested that citizens of the Calumet industrial district work for the widening of the Sag canal as a connecting link from the south shore of the lake for the Lakes-to-Gulf waterway project. Plans for the Calumet harbor development now are well under way. Some opinion is advocating municipal development of the Calumet harbor, while other views are that federal aid also should be sought.

Harbor development in the Calumet region, it was pointed out, has helped to increase the assessed valuation of that region since 1905 from $33,000,000 to $434,000,000. Indiana has built three harbors in the Calumet region since 1906.

Water Diversion Case

The final decree in the Lake Michigan water diversion case may be handed down by the United States Supreme Court on April 14, when the court's sessions are to be resumed after the present recess. Oral arguments, based on exceptions to the report of the special master, Charles Evans Hughes, were concluded March 13 in Washington.

As Mr. Hughes, since making the report, has become chief justice, he is not sitting with the court in this case because of his former status as master in chancery. The Hughes report recommended to the court plans for decreasing the diversion and for sewage treatment works to be built by the Chicago sanitary district.

Counsel for the Great Lakes states all urged that the final decree of the Supreme Court should require the sanitary district to return to the lake all water from the sewage disposal plants, the surplus of water withdrawn for Chicago municipal purposes and the water gathered after storms.

Congressman James M. Beck, of Pennsylvania, former solicitor general of the United States, appeared in the oral arguments as special counsel for the sanitary district, and asked that the court's final decree be made flexible enough to permit adjustment of the amount of diversion required for the proposed Lakes-to-Gulf waterway.

February Lake Levels

The United States lake survey reports the monthly mean stages of the Great Lakes for the month of February as follows:

Lakes	Feet above mean sea level
Superior	602.19
Michigan-Huron	580.58
St. Clair	575.28
Erie	573.22
Ontario	247.05

Lake Superior was 0.14 foot lower than in January and it was 0.23 foot lower than the February stage of a year ago. Lakes Michigan-Huron were 0.03 foot lower than in January and they were at the same level as the February stage of a year ago. Lake Erie was 0.13 foot lower than in January and it was 1.16 feet higher than the February stage of a year ago, 2.10 feet above the average stage of February of the last ten years. Lake Ontario was 0.40 foot higher than in January and it was 1.12 feet higher than the February stage of a year ago, 2.03 feet above the average stage of February of the last ten years.

Make Shipping Agreement

An agreement between the Nicholson Universal Steamship Co., Great Lakes Transit Corp. and Spokane Steamship Co. was announced Mar. 13 by the shipping board. Both the Spokane companies and Great Lakes Transit Corp. are actively engaged in the solicitation of automobile traffic on the Great Lakes, particularly from Detroit to Duluth; but the Spokane companies are stated to have insufficient equipment to handle their expected automobile traffic to or via Lake Superior, while Great Lakes Transit has available space and equipment to enable it to transport a considerable portion of the business contracted for by the Spokane companies. Because of this situation the mutual operating agreement as outlined below has been entered into:

The Spokane companies agree to transport automobiles from Cleveland or Toledo to Detroit when routed via Great Lakes Transit Corp. and destined to or beyond Duluth at a flat rate of $5 per automobile, free of all dockage or other charges. The Great Lakes Transit agrees to transport automobiles from or via Detroit when routed via the Spokane companies to or via Duluth, provided space is available; the Spokane companies to assume the cost of loading the automobiles at Detroit, to insure the same at their own cost, and at their own expense to attend to the collection of transportation charges and all clerical matters pertaining to said automobiles. For transporting automobiles routed via the Spokane companies Detroit to Duluth, Great Lakes Transit is to receive the excess of the published rate over $6 when said rate is in excess of $18; the excess over $5 when published rate is $18, and when published rate is less than $18 the same percentage of the published rate as its compensation under the $18 rate bears to $18, or 72 2/9%.

Launch Big Freighter

On Saturday March 8, the first of the two freighters building for the Pittsburgh Steamship Co. was launched at the River Rouge yard of the Great Lakes Engineering Works. The man for whom the vessel was named, Eugene P. Thomas, New York, vice president of the United States Steel Corp., was present at the launching. The vessel was christened by Miss Mary Caroline Hughes of New York City. Others present included A. H. Ferbert, vice president of the Pittsburgh Steamship Co., H. C. Strom, W. W. Waterson, W. J. Harsant, and Captain William P. MacAvoy and F. B. Smith of Cleveland.

The EUGENE P. THOMAS is 600 feet long, 60 feet beam and 32 feet depth. The vessel is equipped with three scotch boilers and triple inverted engines.

Radiobeacon Changes Are Announced

In a bulletin issued recently by the United States lighthouse service, changes in the operating periods of radiobeacons were announced. According to the bulletin, the schedule of daily operating periods of all United States radiobeacons on the Great lakes, is to be changed so that each radiobeacon will operate during the last fifteen minutes of each hour of the day regardless of weather conditions. In respect to radiobeacons on Lake Michigan and in the western portion of the Straits of Mackinac, this change in schedule is to be effective May 1. Regarding radiobeacons on Lake Erie, Lake Huron and Lake Superior, this change is to be effective at the opening of navigation. In regard to the more distant stations such as Huron Island, Rock of Ages, Manitou Island, Michigan Island, Devil's Island, etc., it is intended to make the change effective as soon as possible after the opening of navigation. Pending the change in schedule at any station, radiobeacons will continue operating on the schedules of past seasons. A new radiobeacon chart is to be published in the near future.

Spring Ice Conditions

Reports from the stations of the weather bureau and the meterological service of Canada supplied the following information on ice conditions on the Great Lakes March 20. On Lake Superior the ice in the harbor of Duluth-Superior averaged 19 inches with lake fields extending out about five miles to open water; solid ice extending from Port Arthur beyond Thunder Cape; floating fields off Marquette from Grand Marais, Mich., to White Fish Point; ice extending beyond vision and is heavy; other localities reported 14 to 22 inches thickness.

For Lake Michigan the harbor at Escanaba had 19 inches; no ice was reported along the west shore of Michigan nor along the east shore except from north of Frankfort to the straits. At the straits of Mackinac 14 inches of snow-covered ice extends from East Sheboygan beyond the eye's reach west of Mackinac.

For Lake Michigan extensive fields of ice cover the extreme north portion and also extending south to below Thunder Bay Island. Ice around Thunder Bay extends three miles out with floating fields beyond from St. Clair river open to Lake St. Clair. On Lake St. Clair and the Detroit river ice stopped running on March 18 and none has been seen in the Detroit river since that date.

For Lake Erie new ice fields were reported over the west and central portion and harbors were reported open east to Erie. Even though some floating fields of ice existed off Conneaut harbor carferries were able to make the crossing without difficulty; no ice exists in the Buffalo harbor.

For Lake Ontario there are some small fields of ice running out of the Niagara river which is open at Austinsburg.

Handle Enormous Tonnage

The fleet of Great lakes freighters transport nine times the amount of freight of all other inland waterways combined. The army engineers report for 1929 gives some idea of the enormous tonnage handled by the fleet of freighters on the Great Lakes.

SYSTEM	TONS-MILES
Atlantic coast rivers	1,419,241,730
Gulf coast rivers	314,446,006
Pacific coast rivers	733,846,161
Mississippi river system including Ohio river and tributaries	5,662,742,961
Other water ways	13,738,734
Canals and conecting channels	1,069,976,876
Great Lakes system	87,178,118,000
Total	96,392,110,468

It was pointed out in the report that the Great Lakes have received 12 per cent of the nation's waterway appropriations while they carry 91 per cent of the nation's inland water borne freight ton-mileage.

Passenger service between Detroit and Cleveland began March 20 when the CITY OF DETROIT III of the Detroit and Cleveland Navigation Co. arrived in Cleveland. The vessel left Cleveland at 11:30 p.m. the evening of the same day for Detroit.

Lake Carriers Report

THE 1929 annual report of the board of directors, executive committee and officers of the Lake Carrier's association Cleveland, which is just from the press, gives a comprehensive summary of the Great Lakes trade for the past season. In the opening chapter it is stated that although the financial disturbances of the early fall and slackened grain movement proved deterring factors to late shipping, the year 1929 as a whole witnessed such marked progress and expansion in the demand for bulk freight commodities that the season's trade, transacted in practically eight months of vessel operations, rose to a new peak record of 138,574,441 net tons.

Elevators on Freighters in Package Service

Canada Steamship lines have started a program for equipping the package freight vessels of the line with steel elevators. The company experimented with these elevators on the FERNIE and CITY OF WINDSOR during the past season and the resulting efficiency was so high in both loading and unloading of freight that the company determined to equip ten vessels of its package freight fleet with the elevators.

The elevators being installed are approximately 7 x 15 feet, operated by a hoisting winch. Installation of the elevators permit the storage of goods after they have been trucked on board without necessity of further handling.

Vessels of the line which are being fitted with the elevators are: CITY OF MONTREAL, CITY OF TORONTO, CITY OF KINGSTON, CITY OF HAMILTON, CANADIAN, EDMONTON, WEYBURN, BEAVERTON, SELKIRK and HURONIC.

All of the vessels which are engaged in express package service between Montreal, Kingston, Toronto and Hamilton, are to be in service this season with this new equipment.

Harbor Improvements

The board of army engineers on March 8 recommended that the extension of breakwater in Waukegan Harbor, Illinois, not be made. This recommendation applied to the detached section of the Waukegan breakwaters. Approval was made by the board of the extension of the outer breakwater to the shore, the estimated cost of which was $251,000. Dredging near the north jetty and enlarging the innerbasin were also approved by the board. Other proposed harbor improvement projects on the Great Lakes include Saginaw river, Michigan; Ashland Harbor, Wisconsin; Monroe Harbor, Michigan; Menominee Harbor, Wisconsin and Michigan; Grand Haven Harbor, Michigan; Indiana Harbor, Indiana; St. Mary's Falls canal, Michigan; Detroit river, Michigan; Fairport Harbor, O., and Buffalo Harbor, N. Y.

Many Aids to Navigation

That vessel operators on the Great Lakes are rapidly adopting aids to navigation can be seen in the statement that 182 vessels on the lakes are now equipped with radio telegraph and 451 with radio direction finders. Gyro compasses are fitted

(*Continued on Page* 114)

Santa Clara Sea Trials

(*Continued from Page* 84)

The value of the United States' exportable surplus in 1926 was almost five billion dollars. Our total bill for ocean freight was more than three-quarters of a billion dollars. American farmers saw ocean freight rates on wheat rise from approximately 8 cents a bushel in 1914 to 27 cents in 1915 and then soar to $1.36 per bushel. By 1927 more than one-sixth of the total of American products were being sold abroad.

American manufacturers and American farmers generally have come to view American shipping in a new light. The shipping board has disposed of vast numbers of old and obsolete ships built during the war. The cost to the government of the operation of its merchant fleet has been reduced from more than $40,000,000 annually to less than $10,000,000. Government ships have rapidly been transferred to private ownership.

The fast and up-to-date SANTA CLARA is a result of the new policy for fine, well built modern ships to meet the new standards of speed in ocean transportation and to be fitted with the latest equipment throughout to increase efficiency and safety.

Will Make Long Cruise

The steamer MALOLO will go on a "million dollar" cruise around the Pacific next fall, according to an announcement made by J. E. Ryan, general passenger manager of the Matson line. Many new and interesting ports have been added to the itinerary of her famous voyage of last year. The MALOLO will visit Bali in the Celebes islands, Thursday islands, and Wellington, N. Z. According to present plans, she will steam out of the Golden Gate on Sept. 20 to visit the principal ports in 14 countries and after a cruise of 90 days covering almost 23,000 miles, will return to San Francisco Dec. 20.

Expand Soviet Shipyard

(*Continued from Page* 99)

small boats, in different stages of construction, for the use of the department of forestry, and it was again explained that every part including the engines had been made in the Union of Socialist Soviet Republic.

The present dry dock used by the yard is a floating one and was brought in sections from Japan. Formerly there was a very large one but neglected for ten years it is not usable. A few patches in the cement and new gates will restore it to service but it is first planned to enlarge it to hold 1000-foot ships.

Large gangs of plant maintenance men are at work in all parts of the yard on needed improvements.

Bernard J. Hausfeld, for many years connected with the Lunkenheimer Co., Cincinnati, O., in charge of advertising, died suddenly Feb. 18.

What the British Are Doing

THE most important move in the British shipbuilding industry which has taken place for some time is the registration of the National Shipbuilders Security Ltd. with a nominal capital of £10,000 but with borrowing powers up to £3,000,000. It is announced that this marks the launching of a collective scheme within the industry itself by which it hopes to eliminate redundant capacity and secure more economical costs by the resultant concentration of production. The leading objects of the new company as set out in a Memorandum of Association are:

(1) To assist the shipbuilding industry by the purchase of redundant and/or obsolete shipyards, the dismantling and disposal of their contents, and the resale of the sites under restrictions against further use for shipbuilding.

(2) To enter into contracts with shipbuilders and others for the payment to the company of any sum or sums of money for the advancement of the purposes of the company.

(3) To purchase, take or lease, or otherwise acquire shipyards, workshops, docks (graving or otherwise), factories, wharves, or any other conveniences for the building, repairing or docking of ships or vessels of any kind and to sell, dispose of or deal with and turn to account the same in such manner as may be thought fit.

* * *

SIR ARTHUR MUNROE SUTHERLAND in his presidential address to the chamber of shipping of the United Kingdom, said the shipping industry was hit as hard if not harder than any other British industry. Nevertheless in the last ten years it had re-established its position not only in the overseas trade but in the carrying trade of the world at large. To those engaged in the industry it had been a hard fight to hold their own. To do it they had to pass on to their employes the full benefit of the saving that had resulted from the use of more efficient ships. "We shall be beaten in the markets of the world if we cannot accommodate ourselves at least as quickly as other nations to getting the utmost for our customers out of the machine age," Sir Norman added.

* * *

A NUMBER of fresh contracts have been obtained recently on the Clyde but it is recognized that work is falling off steadily in some of the larger shipyards. There were launched during February all over Scotland 17 vessels of 56,643 tons. For the two months ended February the total is 27 vessels of 79,094 tons, which is considerably higher than the average for the period.

William Beardmore & Co. Ltd. of Dalmuir are building two high class cargo steamers each of about 9000 tons deadweight carrying capacity for John Campbell & Son, Glasgow. The vessels, keels for which have been laid, will be provided by the builders with reciprocating engines working in conjunction with Bauer-Wach low pressure turbines and they will be constructed under the supervision of John Crookson & Son, London. The largest vessel launched in the Clyde in February was the CLYTONOUS, a twin screw motorship of 6400 tons built by Scotts Shipbuilding & Engineering Co. Ltd.

* * *

THE British Tanker Co. Ltd. London, a subsidiary of the Anglo-Persian Oil Co. Ltd. has placed with the Greenock Dockyard Co. Ltd. a second order for a motor tanker of about 10,000 tons deadweight. The first was placed in January when they were ordered by the same owners from Lithgows Ltd. two similar vessels. All four ships will be propelled by Harland B. & W. internal combustion engines supplied by John G. Kincaid & Co. Ltd.

Old Timer Engineers' Annual Dinner

The annual dinner of the Old Timer Marine Engineers was held in New York on March 12 under the auspices of the Ocean Association of Marine Engineers. George J. McDermott, president of the association, delivered the address of welcome and George A. Hopkins, attorney for the association, acted as toastmaster.

Amos S. Hebble, superintending engineer of the Morgan line, in a brief address dwelt on the contrast between the old days of hand firing and the improved propulsion systems of the present day. "In the old days," he said, "the boiler pressures were from 90 to 165 pounds, with steeple compound, fore and aft compound and triple expansion engines with Scotch boilers.

"Many changes have occurred since then to make the engineer's lot more comfortable. The introduction of oil as fuel probably accomplished more in this direction than anything else in the past 33 years. Where oil fuel has left off, powdered fuel will eventually take its place on all coal burning ships. The days of the coal shovel, slice bar and ash ejector are destined to pass forever.

"Boiler pressures have been increased on ships in service in this country to 350 pounds. Superheat, but little known at that time, has crept up to approximately 225 degrees Fahr. today. The water tube boiler is rapidly superceding the Scotch boiler on account of its light weight, higher efficiency, reliability and many other advantages. The turbine, on account of its higher efficiency, light weight, low maintenance cost and all around reliability, is rapidly forcing the reciprocating engine to the background.

"Geared turbine installations which would have been a curiosity 30 years ago are operating today at an efficiency unheard of even five years ago. The internal combustion engine is a further step in marine engineering and is rapidly and satisfactorily advancing in the stage of marine propulsion.

"It is safe to say the next 33 years will bring forth in the engine room at sea many new and important features and may be even more striking than those we old timers have experienced in the past 33 years."

H. G. Smith, president of the National Council of Shipbuilders, spoke on general conditions in the shipbuilding field. William L. Bunker, vice president in charge of operations, United States lines, and Mr. Amos S. Hebble were presented with testimonial gifts.

The annual report of the commissioners of the Massachusetts Nautical school for the year ending Nov. 30, 1929 has been received.

Oppose LaFollette Bill as Burdensome

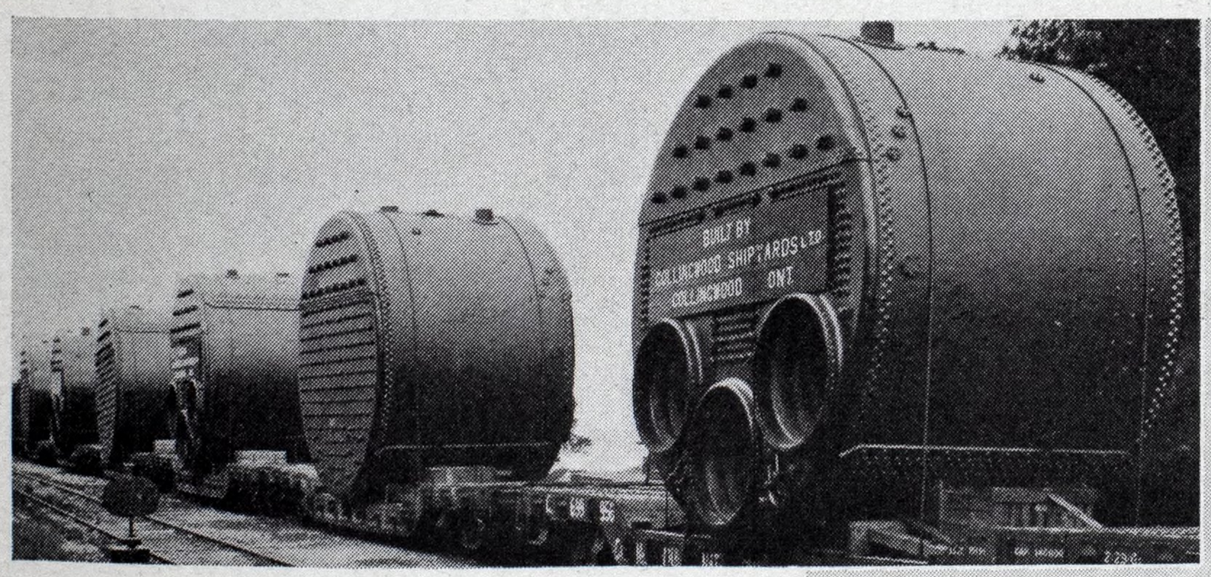
By order of its executive committee the Merchants' association of New York has taken steps to oppose the enactment by congress of Senator La Follette's bill to amend the marine laws of the United States relating to American seamen. This legislation deals with the conditions of employment, payment and treatment of seamen on American-flag ships.

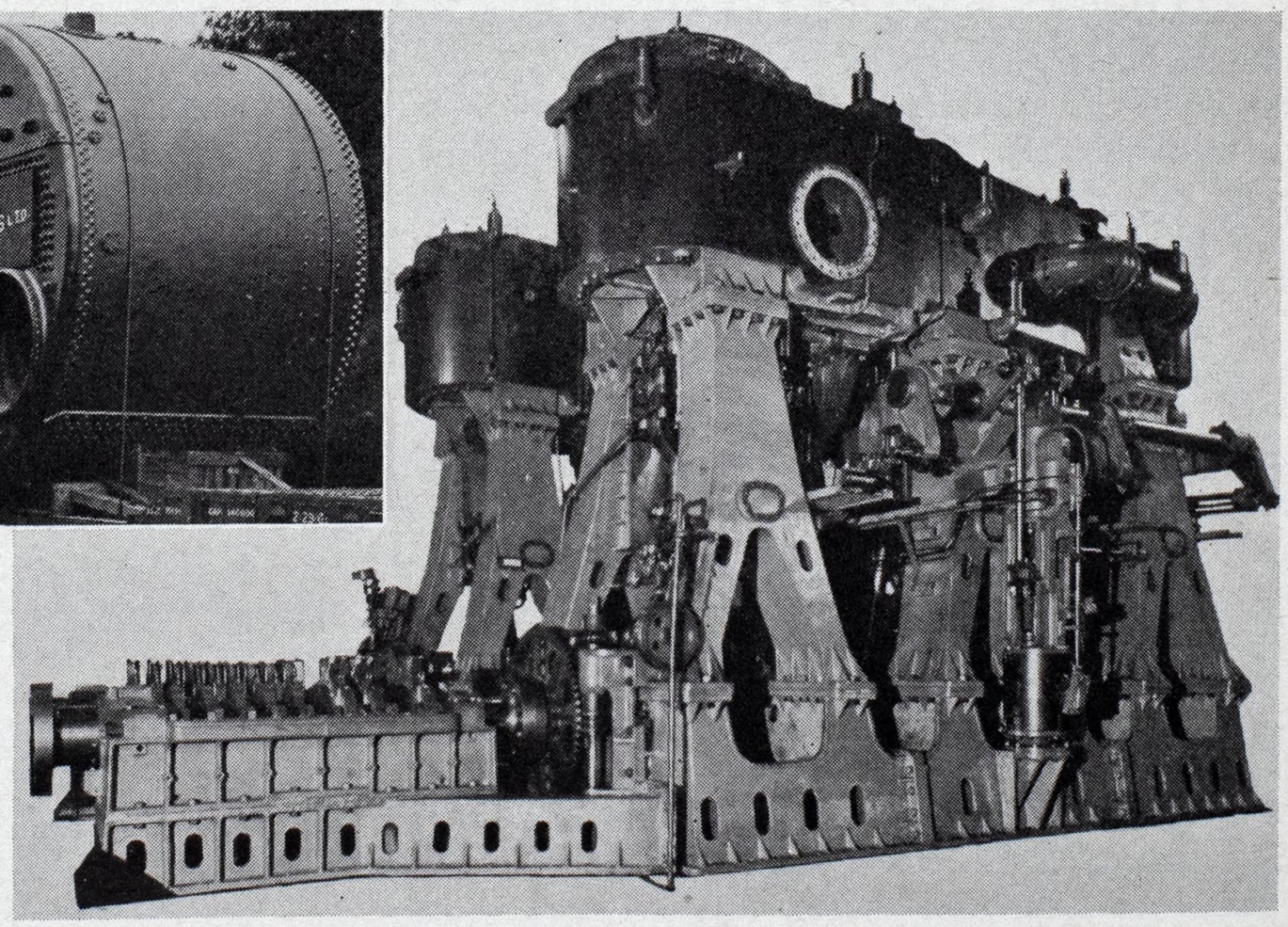
After a careful study the maritime committee of the Association, of which M. A. Kerwin is chairman, reported as follows:

"This bill would, if enacted, place a further heavy burden upon the operators of American-flag shipping while at the same time, in the judgment of the committee, it would not produce the relief and benefits for American seamen which its advocates desire to secure. Your committee believes that with the present vigorous efforts of the United States government to build up an American merchant marine, further legislation should not be enacted which would place American shipping at a greater disadvantage with the shipping of competing nations."

Directors of the Hamburg-American line following their meeting on March 13, announced the declaration of a 7 per cent dividend for 1929.

Powerful Propulsive Unit for Ice Breaker





THE accompanying illustration shows six Scotch boilers and a set of twin screw triple expansion engines recently completed by the Collingwood Shipyards Ltd., Collingwood, Ont. for the ice breaker N. B. McLean which is being built by the Halifax Shipyard Ltd., Halifax, N. S. for the department of marine and fisheries of the Dominion government. The ice breaker is intended for service in Hudson Straits.

THE engines have cylinders, 27½ x 43 x 70 inches x 42-inch stroke. The boilers are 15 feet 6 inches in diameter and 11 feet 6 inches long. Working boiler pressure is 185 pounds per square inch. The whole installation is designed to develop 6500 indicated horsepower at sea.

Personal Sketches of Marine Men

Frederic R. Harris, Consulting Engineer

By L. E. Browne



HIS promotions in the navy were rapid in recognition of his outstanding ability as an engineer on dry docks and waterfront projects.

HE WAS the first to propose building a dry dock in sections using floating caissons. This method was successfully used at Pearl Harbor.

LATEST and most important private project carried out from his designs and under his supervision is the new large graving dock in Brooklyn, N. Y.

PROMOTED from lieutenant to lieutenant commander and after a few months rear admiral in the United States navy after 13 years of service, Rear Admiral Frederic Robert Harris, retired, now consulting engineer at New York, is considered the leading dry dock engineer of the country.

He has built and planned floating and graving dry docks from coast to coast and in several foreign countries. His latest work was the completion of the giant graving dock at the Robins plant of the Todd Shipyards Corp., Brooklyn, N. Y. Admiral Harris completed this dock in 18 months, confronted with the most serious of natural difficulties—quicksand.

He was the first to propose building a dock in sections, using floating caissons. This was at Pearl Harbor where he was sent when that work collapsed. This dock was the first and only one ever built on a coral reef.

Born in New York city, April 10, 1875, Admiral Harris graduated from the Stevens Institute of Technology, Hoboken, N. J., in 1896, and in 1921 he was given the honorary degree of doctor of engineering. He was an admiral before he was 40. He entered the service as lieutenant, civil engineer, Jan. 3, 1903, and became chief of the bureau of yards and docks and temporary rear admiral in 1916. He became permanent rear admiral senior grade in August of that year and retired in February, 1927. It was Admiral Harris who first suggested the plan for laying the famous North sea mine barrage.

During his service in the navy, Admiral Harris had charge of building docks and dry docks at New York, Boston, Charleston, S. C., Norfolk, Va., Mare Island, League Island, Pearl Harbor, Philadelphia, Guantanamo, Cuba, and other points both here and abroad.

At New York in 1910-12 where he built dry dock No. 4, he used the pneumatic caisson for the first time, completing the work after seven years of failure. He was sent to straighten out the trouble at Pearl Harbor in 1913 and went to Boston in 1913-1915 as consulting engineer for the Boston Port commission, acting as advisor in the erection of the Massachusetts state docks.

He resigned as chief to succeed Colonel Goethals as general manager of the Emergency Fleet Corp. of the shipping board. He then went to Hampton Roads in charge of all war construction and headed the war board of control. Included in this work were two graving docks for the Fleet corporation. Going to Philadelphia in 1920, he completed the dry dock there in 1923. He again went to New York and in February, 1927, he retired under a special law affecting rear admirals who served as such during the world war on completion of 10 years of flag rank.

He has acted as consulting engineer for the Todd plants, the Port of Havana docks, New Orleans and Mobile, examined and designed docks, piers and foundations in Newark, and the Sound, supervised the Goethal's bridge foundations, subway construction and many other projects along the Atlantic seaboard. Added to his many and diversified activities, he is associate editor of the American civil engineers handbook, river and harbor works.

He is a member of many clubs and technical societies including the American Society of Civil Engineers; Society of Naval Architects and Marine Engineers; Society of Terminal Engineers; Naval institute and Atlantic Deeper Waterways association.

Up and Down the Lakes

(*Continued from Page* 109)

on 235 vessels which are passenger boats and six other vessels are fitted with automatic pilots.

Through use of the radio vessel operators are enabled to keep in close communication with their vessels and by so doing give new orders to the masters of these vessels thus saving a great deal of time and consequently money. These pieces of equipment have been installed on Great Lakes vessels by the Radio Corp. of America, the Inter City Radio Telegraph Co., and the Sperry Gyroscope Co. The latter conducts a school in which masters of vessels are instructed in the use of the gyro compass and the metal "mike."

Several of the Great Lakes steamship companies are adding passenger service to some of the Michigan and other upper lake resort communities.

Shipyard Reduces Capital

IN A LETTER to its preferred and common stockholders, dated Feb. 25, the American Ship Building Co., Cleveland, O., proposes a plan for the reduction of its capital funds, stating that it has long been evident to the management and directors that the company has more capital than can be profitably employed in the business. The excess capital is invested largely in United States government securities at a comparatively low rate of interest.

During the past four years the company has disposed of practically all of its surplus property and equipment, realizing over $2,000,000 from these sales. During the past year, also the company's federal tax case covering the period from Jan. 1, 1918, to June 30, 1921, was settled for approximately $1,500,000 less than the amount previously reserved for this purpose.

The board of directors at its last meeting on Feb. 5 unanimously approved the following plan for reduction of capital presented by the finance committee:

(1) The present authorized common stock amounting to 155,000 shares of the par value of $100 each shall be changed into an equal number of no par shares. This is to be accomplished by first reducing the par value of the present common shares from $100 to $60 and then changing such shares into no par common shares.

(2) The new no par common shares shall have a stated value of $60 each instead of $100 as at present, thus reducing the stated capital of the company represented by common stock outstanding from the present figure of $14,714,400 to $8,828,640.

(3) All of the present outstanding common shares of the par value of $100 shall be exchanged for an equal number of new no par common shares, plus $40 in cash for each share, which is a capital distribution equal to the amount of the reduction of common capital of the comapny.

(4) For possible future uses the authorized number of common shares shall be increased to 230,000 and all unissued common shares shall be free from any and all pre-emptive rights of stockholders of the company.

(5) If the foregoing steps are approved the holders of preferred stock, if they so desire, shall have the privilege up to July 1, 1930, to sell all or any part of their preferred shares to the company at $110 a share or to exchange preferred shares for 1 1/10 shares of new no par common stock and $44 in cash.

If the above plan is approved and carried out, the company will still have net current and working assets of over $5,000,000, which is believed to be ample for all present requirements.

After allowing for the loss in income on the amount which it is proposed to distribute to the stockholders, and non-recurring items, the average earnings for the past five years applicable to the outstanding common stock, have exceeded $5.50 per share, after providing for federal income taxes. Since the company is amply financed, it is anticipated that the present dividend rate on the common stock, which is $8 per $100 and which would amount to $4.80 per share annually on the new no par common stock, can be maintained.

Cruiser Built in Dock

The 10,000-ton cruiser LOUISVILLE was floated at Bremerton Wash., in a preliminary launching without the use of ways. The LOUISVILLE was built in a dock which is the only one of its kind in the United States. She was erected on the dry floor of the dock and no water admitted until the craft was floated. Formal christening of the cruiser will probably take place Labor day.

Annual Report Shows Record Profits

Great Lakes Engineering Works, Detroit, reports for the year ended Dec. 31, 1929, record net profits of $867,823 after all charges including federal taxes, equivalent after preferred dividends to $7.80 a share on the 106,250 shares of common stock outstanding at the end of the year. On the basis of present 212,500 shares outstanding (increased to this amount by payment of a 100 per cent stock dividend Jan. 20) per share earnings were $3.90.

This showing compares with $417,130, equal after preferred dividends to $1.73 per share on the present capitalization in 1928 and is more than double the showing in that year. The exceptional earnings last year are accounted for in part, however, by a non-recurring profit item of $347,481 which arose from sale of acreage to the Great Lakes Steel Corp. Elimination of this item from 1929 earnings, however, would still leave net profit of $593,913 after all charges except federal taxes compared with $468,991 in 1928, an increase of $124,922 or 26 per cent.

During 1929 the company retired the balance of its 8 per cent preferred stock amounting to $597,900 plus a 10 per cent premium entirely out of earnings. This was part of $1,000,000 issue sold in 1923 to provide in part funds for retirement of then outstanding bonds amounting to $1,250,000. Elimination of this capital liability leaves the corporation with only 212,500 shares of $10 par stock outstanding.

"The outlook for 1930 is very favorable despite the general unsettlement of business conditions," according to J. A. Ubsdell, president. "Company now has sufficient orders to insure capacity operations through the first half of this year and has sufficient new business in sight to insure a good volume of business beyond that time without counting the usual heavy business which starts when navigation opens."

One of the most significant items in the balance sheet is the valuation of $637,357 which the company places upon land and water frontage owned in Detroit, Ecorse, River Rouge, Detroit river, and Ashtabula harbor. At current prices for industrial properties on the Detroit river in Ecorse and River Rouge in the heart of the new industrial area which is developing, the company's holdings in that section alone should be worth far more than the valuation at which it carries all of its properties.

German Ship Pool Reported Ready

The proposed pool of the Hamburg-American line and the North German Lloyd is regarded in German financial and shipping circles as practically completed, although definite statements are withheld until after the meetings of the executive boards of both lines are held on March 24 and 25.

The 50-year agreement as proposed will call for the creation of a super-directorate and super-executive board composed of the leading officials of both companies, and co-operation in the use of harbor officials, financial assets and business departments, as well as the coordination of schedules to reduce wasteful competition and the number of sailings, and the division of profits on a fifty-fifty basis.

For the past year the two lines have been engaged in sharp competition but owing to the strong international rivalry which now exists in shipping and which is steadily increasing, the two companies will probably join hands in self-defense. Under the proposed pool arrangement the company would operate about 330 ships aggregating 2,000,000 tons. The Hamburg-American line is now operating 300,000 tons of shipping in the North Atlantic trade while the North German Lloyd, with the addition of the EUROPA, has a slightly larger total. The Hamburg-American and the Hamburg South America line each operate 210,000 tons in the South American trade, while the North German Lloyd is operating about 150,000 tons in this trade. On the India and Far East routes each company is operating about 180,000 tons. Together the lines control 100,000 tons in the West Coast United States services.

The net earnings of the North German Lloyd last year were 14,193,124 marks, on which an 8 per cent dividend was declared. The net profits of the Hamburg-American in 1929 were 11,561,000 marks, on which the company will pay 7 per cent.

Temporary headquarters of the New York Maritime Exchange are to be at 16 Pearl street, pending the construction of the new 32-story building on the site of the present building and adjacent property.

American Lines to Merge

Negotiations are reported under way for the consolidation of the American Hawaiian Steamship Co. and the Dollar Steamship line. If such a consolidation is effected, it would weld the two companies into one of the most powerful under the American flag. Under the proposed arrangement, neither company would lose its identity and the consolidation would take the form of a holding company, with both lines operating much as heretofore with perhaps a segregation of territory.

Reports Record Sales and Earnings

As shown by its annual report, which was made public March 12, the sales billed, orders booked, and net income of the Westinghouse Electric & Mfg. Co., for the year ending Dec. 31, 1929, exceeded those for any previous year in the company's history.

The volume of unfilled orders on Jan. 1, 1930, was $62,025,399, a gain of approximately $15,000,000 over last year. The total of current assets is more than six times the total of current liabilities which represent the entire indebtedness of the company. The surplus shows an increase during the year of $29,729,690. The operating income was $27,062,611 and deducting the dividends paid or declared aggregating $11,327,668, the increase in surplus from operations was $15,734,943. The balance, $13,994,747, of the total increase in surplus represents the net gain from the sale of additional common capital stock at a premium, the proceeds from which sale were used to redeem the outstanding issue of $30,000,000 bonds.

The committee of Lloyd's Register of Shipping recently announced the withdrawal of several of the society's surveyors in Russia owing to the approaching completion of vessels building to Lloyd's classification. When the vessels are finished, the remaining surveyors will also be withdrawn.

Cadets Graduate from Sperry School



THIRTY-FIVE cadets from the New York State Nautical Training ship NEWPORT recently graduated from the Sperry Gyro-Compass school. At the conclusion of their examination, the president of the Sperry company, Mr. Morgan, spoke to the boys, and Capt. Tomb, U. S. N., retired superintendent of the Nautical school thanked the company for instructions received. The accompanying illustration shows the group of cadets. From left to right, seated in the foreground, are Mr. Morgan, president Sperry Gyroscope Co., Inc.; Capt. Tomb, superintendent New York States Merchant Marine academy, and Mr. Brierly, instructor at the Compass school.

Obsolete Equipment

(*Continued from Page* 106)

He knows that progress is constant and he knows from experience that an aggressive effort to get the facts of progress is profitable.

The adoption of new gear or new methods by the ordinary means is too slow. In one instance many months were wasted before changing an obsolete method of stowing certain cargo because there was no adequate method of finding the one best way and of putting the one best way into effect. The services of a consultant would have saved many dollars in profit for this company.

A further characteristic of the consultant is that he is a trained investigator. He is trained in the use of the scientific method. The essentials of the scientific method are—

1. Analysis:

Determination of the need for improvement.

2. Experimentation:

A little of this is worth more than arguments or opinions.

3. Systematic recording of facts:

Memory alone or haphazard records are not sufficient. Complete and accurate records are better if intelligently devised and prepared.

4. Standardization:

What analysis and experiment gain, standardization holds.

5. Control:

Directs effort toward the goal fixed by standardization.

In Factory and Industrial Management for May, 1929, appeared the following:

"It hardly needs demonstrating that working to a definite program based on a careful study of the situation will yield greater results than working by fits and starts and waiting until the need presents itself. Haphazard and piecemeal attempts to improve conditions are often downright destructive of . . . efficiency as well as a waste of time and money."

Finally, the savings and other advantages following the use of modern methods and equipment are so great there is little excuse for not being up to date. Profits may be increased and some unprofitable operations be made profitable by recognizing the high cost of being behind the times.

Fifty Years of Service

The Bethlehem Shipbuilding Corp., Ltd., Boston plant, on Feb. 20 tendered a dinner at the Atlantic Works Dining room to George S. Webster who had just completed 50 years of service at the Boston plant. The dinner was attended by all the foremen of the Atlantic works and the Simpson works, as well as several workmen who have been associated with Mr. Webster for many years.

Mr. Webster entered the employ of the Atlantic works Jan. 13, 1880 in the machine shop. In 1895 he was appointed assistant superintendent and in 1923 was made superintendent, continuing in that position until July, 1928 when the Atlantic works was purchased by the Bethlehem corporation. Mr. Webster is now assistant to the general manager.

New Pennsylvania Piers

Announcement has been made by Henry Herberman, president of the Export line, New York, that he will abandon his five piers in the Greenpoint section of Brooklyn and two more in Staten Island to move his entire operations to Jersey City. An agreement has been reached with the Pennsylvania railroad whereby the Export line will occupy two of its piers as the first move to develop a great passenger and freight terminal on the west shore of the North river. Work has been started on the $70,000,000 pier and warehouse development of the Pennsylvania railroad in Jersey City and the two piers to be occupied by the Export line are scheduled for completion by Dec. 1. The piers will be operated on an open berth plan whereby other lines also may occupy them.

Has Profitable Year

The net profit of the American Hawaiian Steamshhip Co. for the year ending Dec. 31, 1929 was $1,187,421.09 after provision for federal income tax, a gain of $802,604.69 over the previous year. During 1929 the company's vessels handled over 25,000,000 packages of cargo, totaling more than 1,267,000 tons, steamed 1,477,236 miles, transited the Panama canal 220 times and paid Panama canal tolls of $1,120,693.65.

Form New Company

An announcement has been made of the formation of the John Strachan Co. by Christopher Strachan and J. F. Paige to continue the marine consulting survey and appraisal business which was formerly conducted by John Strachan. The new company is also to continue the sale of various marine specialties formerly sold by Mr. Strachan. The location of the John Strachan Co. will be at 17 Battery Place, New York City.

United Dry Docks Inc. Elects New Head

At the February meeting of the board of directors of United Dry Docks, Inc., Edward P. Morse, who has been president of the company since its incorporation, was elected chairman of the board and Joseph W. Powell, president. Mr. Powell has been chairman of the executive committee.

Mr. Morse, who owns a large interest in the company, will continue active in its management. He headed the Morse Dry Dock & Repair Co. prior to the consolidation with other yards into the United, and has been engaged in the drydock and ship repair business in New York harbor for 46 years. Mr. Morse now desires to be relieved of the details of management.

Palen Placed in Charge

Joseph E. Sheedy, executive vice president of the United States lines, announced on March 26 that F. P. Palen has been engaged to take charge of the construction of two monster vessels the United States lines will build to run with the LEVIATHAN in the New York, Cherbourg and Southampton service. The proposed liners have been designed by Theodore E. Ferris, naval architect, and the plans are now with the shipping board for approval.

Mr. Palen, former vice president of the Newport News Shipbuilding & Dry Dock Co., will have his office at 45 Broadway, New York. He will take up his new work on April 1.

The Coen Co., Inc., combustion engineers, Story building, Los Angeles, Cal., have issued Bulletin 16 covering mechanical oil burners for marine boilers. The bulletin is replete with information on Coen products and is well illustrated with half-tones, line drawings and charts.

The CAROLINIAN, first all-welded steamer in America, ran a successful sea test on March 8, making 11.5 knots an hour. No leaks developed and no vibration was experienced. The CAROLINIAN was built by the Charleston Dry Dock & Machine Co., Charleston, S. C.

The directors of the Todd Shipyards Corp. at their regular monthly meeting declared the regular quarterly dividend of $1 per share payable on March 20, to stockholders of record at close of business March 5.

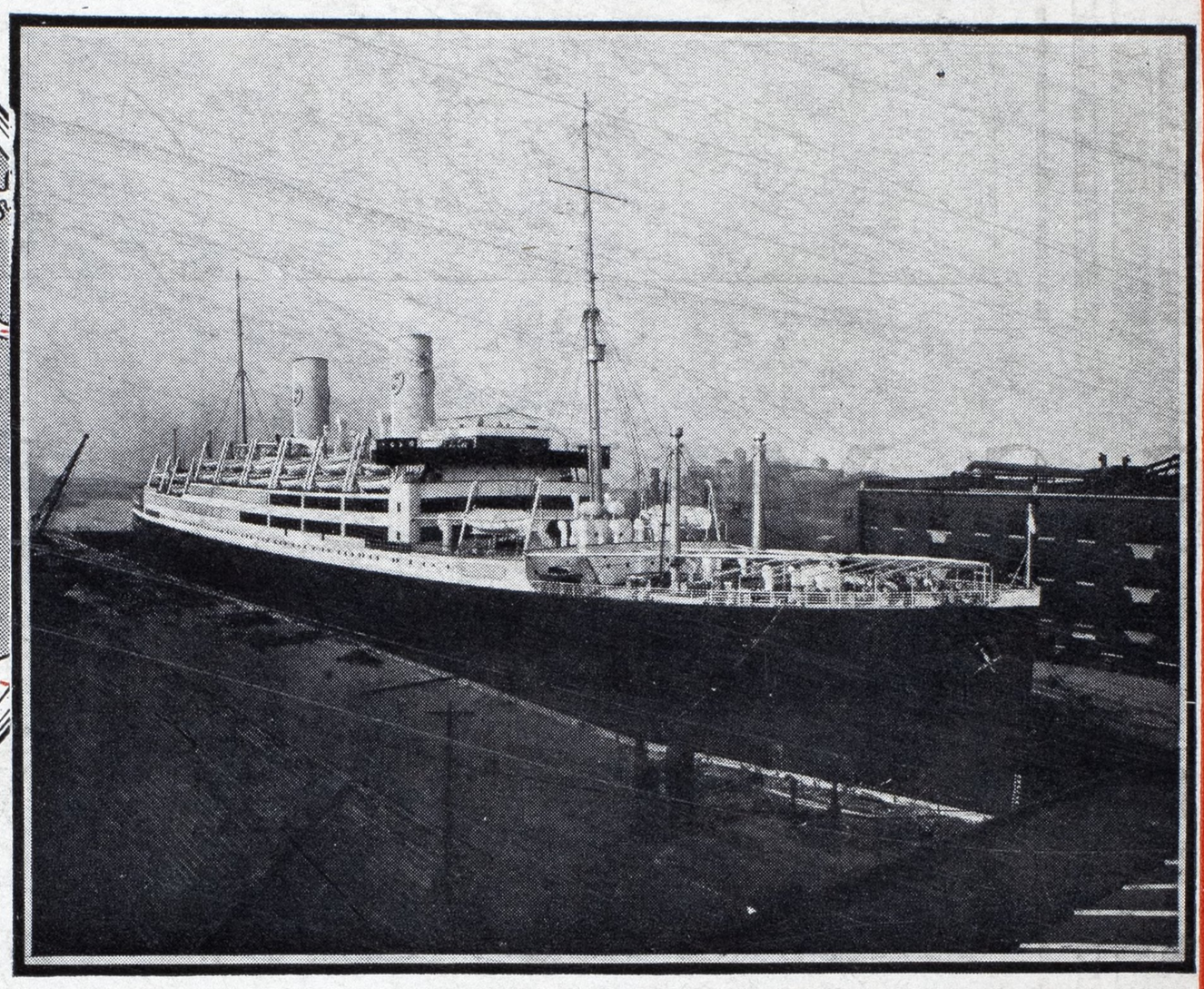
Marine Review

Reg U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water

April, 1930





Drydocked at the Robins Yard for Scraping, Painting and the Usual Minor Voyage Repairs and Back to Her Regular Service between Gothenberg, Sweden and New York in 24 Hours.

M. S. "KUNGSHOLM" the 20 Thousand Ton Swedish-American Liner

Todd all-complete facilities and equipment—including the newest drydock capable of handling vessels up to 731 feet in length—for all operations in repair, conversion and reconditioning, bring to owners and operators a supervised service in New York that is also characteristic of Todd at every Todd Yard on the Atlantic, Gulf and Pacific Coasts.

Todd Service is always available—day or night

TODD SHIPYARDS CORPORATION

25 BROADWAY, NEW YORK

PLANTS

Robins Dry Dock & Repair Co. *Erie Basin, Brooklyn, N. Y.*

Tietjen & Lang Dry Dock Co. *Hoboken, N. J.*

Todd Shipbuilding & Dry Dock Co., Inc. *Mobile, Ala.*

Todd Dry Dock Engineering & Repair Corp. *Brooklyn, N. Y.*

Todd Engineering Dry Dock & Repair Co. *New Orleans, La.*

Todd Dry Docks, Inc. *Harbor Island, Seattle, Wash.*

Todd Oil Burners, Ltd. *London, England*

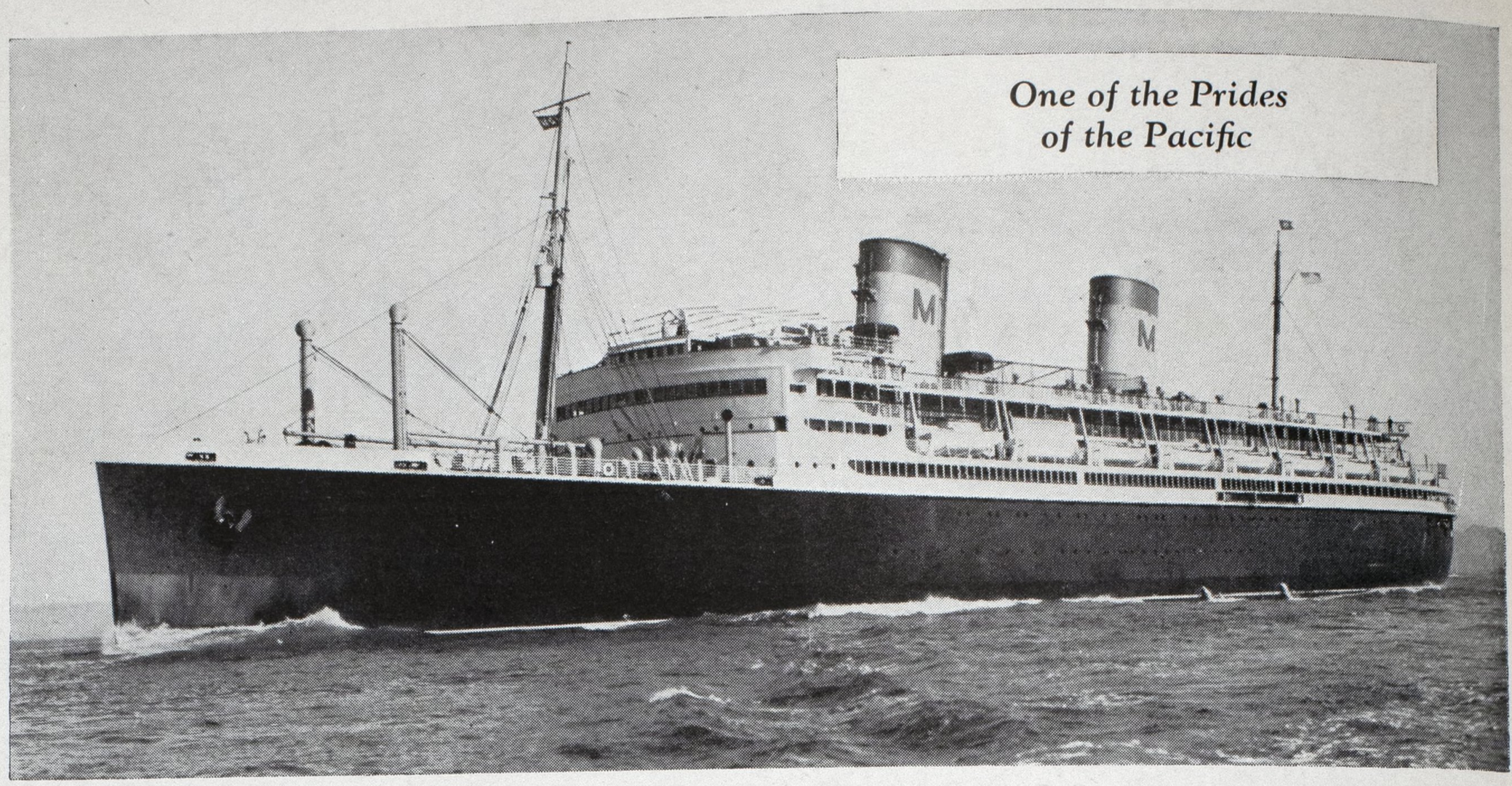
24 Floating Dry Docks
2 Graving Docks **3 Shipways**

Todd Unit System of Burning Pulverized Fuel

Todd Fuel Oil Burning Systems

LARGEST DRY DOCK in NEW YORK HARBOR

TODD NEW YORK, U.S.A.



S. S. MALOLA

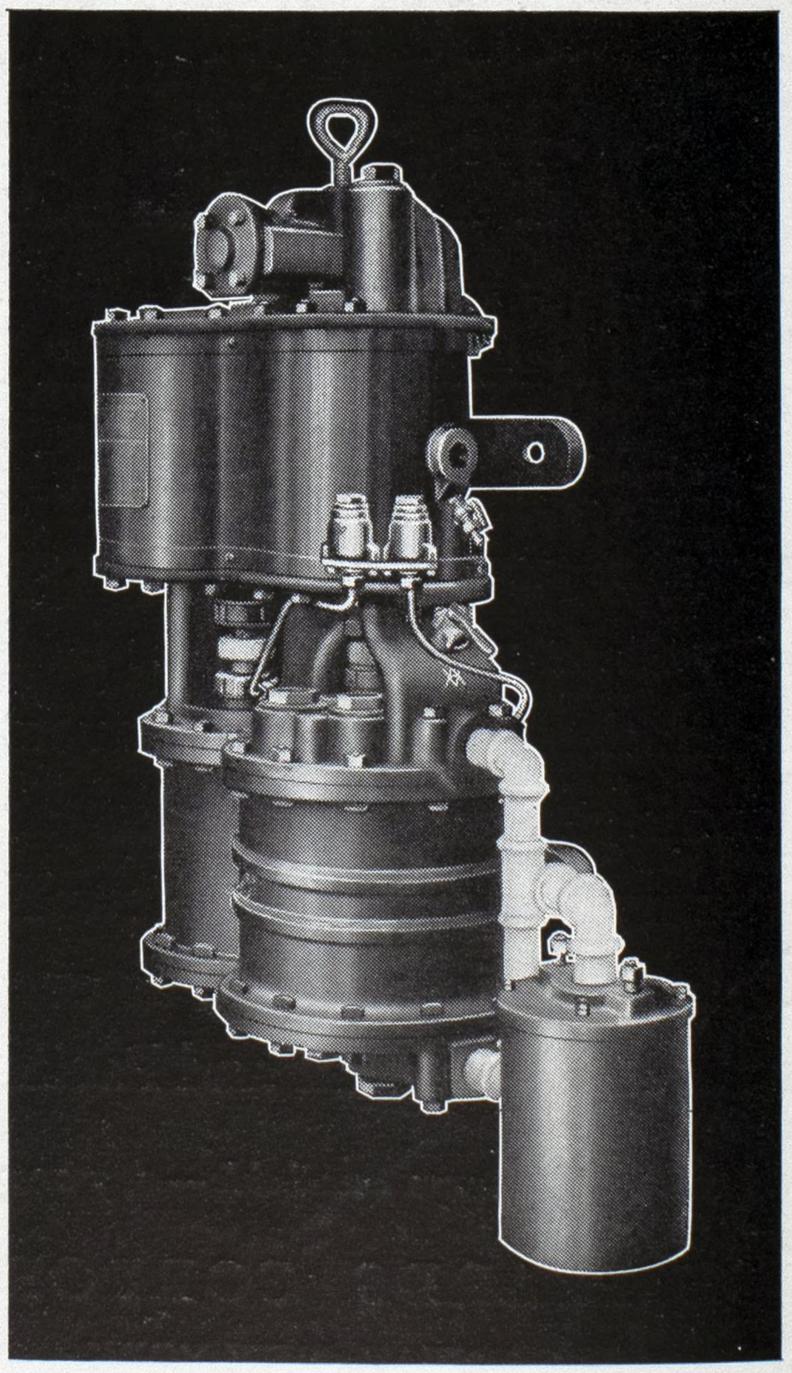
and 16 other

Matson Line Boats use WESTINGHOUSE Air Compressors

Compressed air is now being put to many uses aboard ship . . . removing scale and rust . . . cleaning flues and machinery . . . blowing alarm whistles . . . operating pneumatic tools for making emergency repairs . . . and starting Diesel engines.

Westinghouse-National Compressors have been installed on the entire fleet of many steamship lines such as . . . Export . . . A. H. Bull . . . Dollar . . . Isthmian . . . Lukenbach . . . Consolidated . . . United States Lines . . . and Matson.

The type most generally used is steam-driven, as shown. Where electric current is available the motor-driven type—in sizes from 3 to 700 cu. ft.—is often preferred.



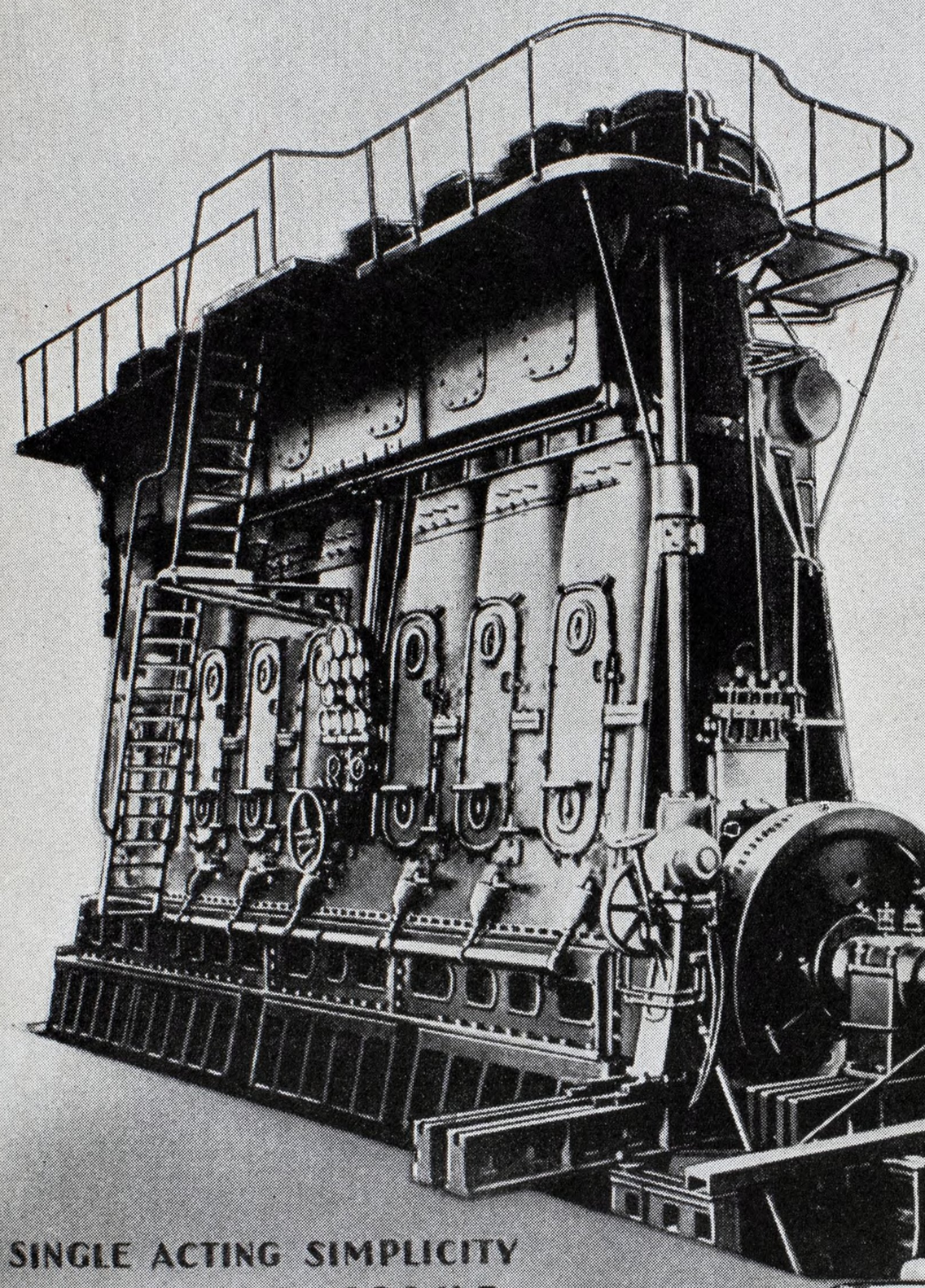
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"QUALITY MACHINES FOR QUALITY SERVICE"

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BUSCH-SULZER

TWO-CYCLE DIESEL MARINE ENGINES

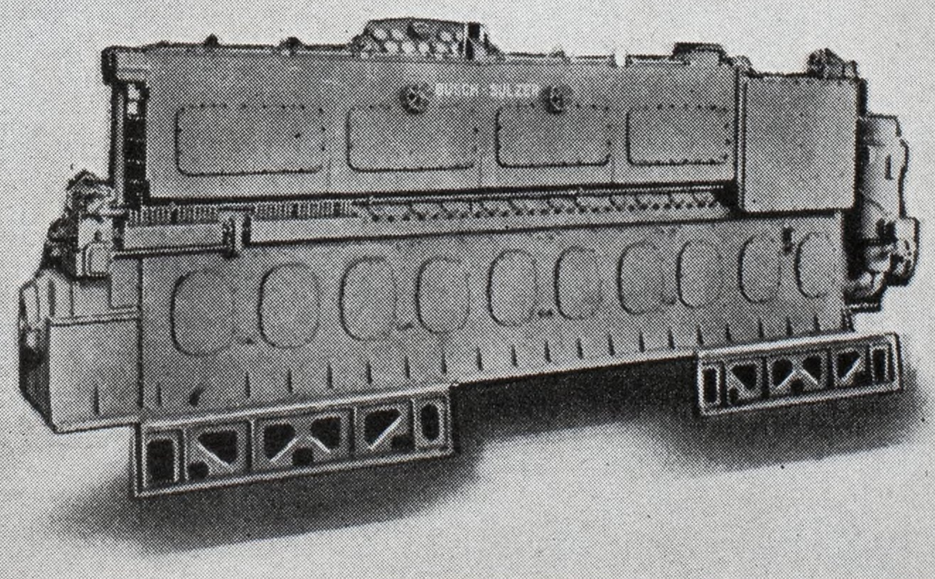


SINGLE ACTING SIMPLICITY
IN SIZES UP TO 7000 H.P.

WORLD LAUNCHINGS
(Gross Tons)

YEAR	TURBINE SHIPS	MOTORSHIPS
1922	776,284	209,557
1923	303,604	225,040
1924	284,640	501,798
1925	262,074	843,629
1926	301,387	704,012
1927	336,263	861,630
1928	363,583	1,180,957
1929	173,642	1,265,743

(from British Motorship—Based on Lloyds Reports)



BUSCH-SULZER BROS.-DIESEL ENGINE CO., ST. LOUIS, MO.

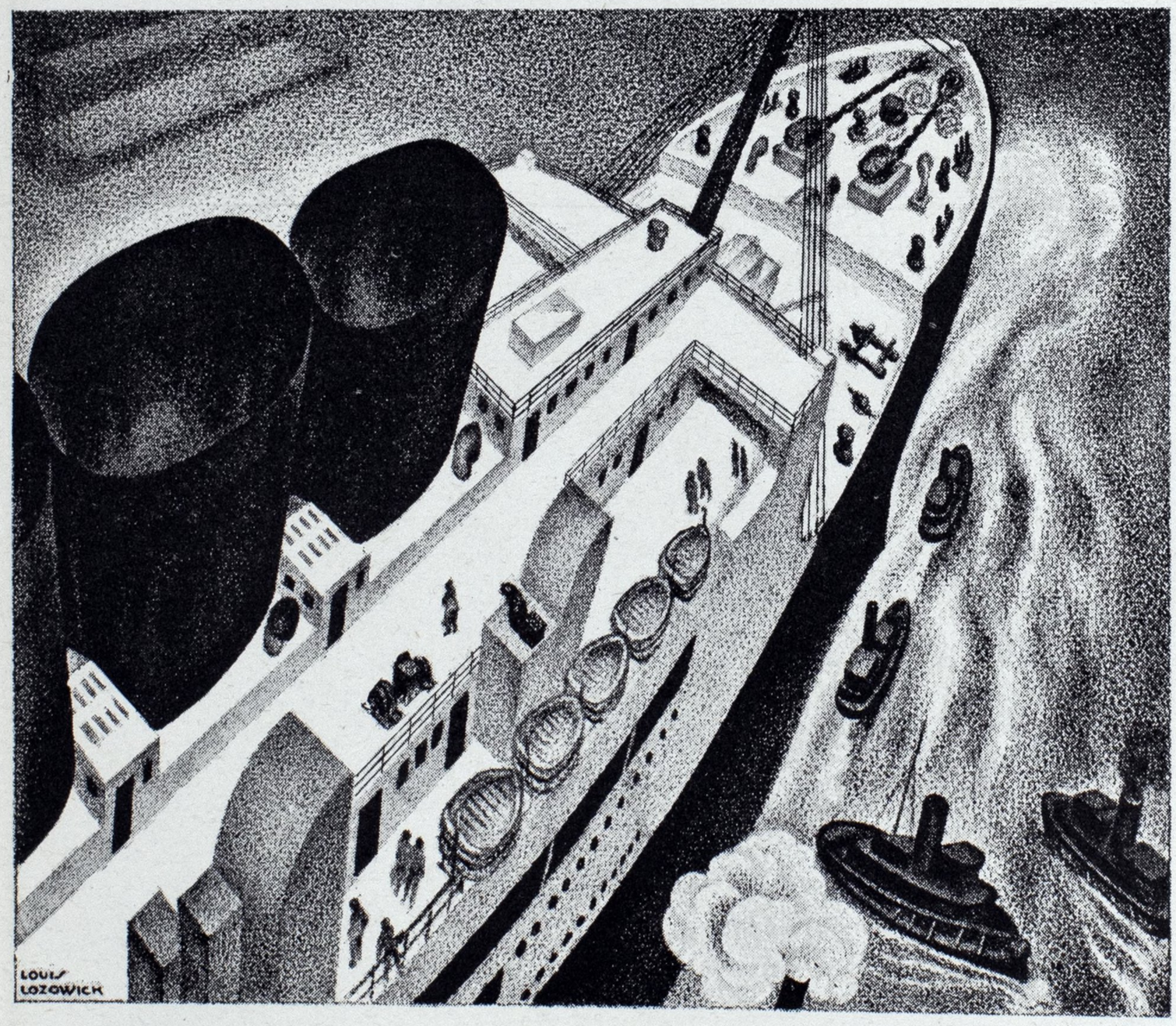
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RIALTO BLDG., SAN FRANCISCO.

Columbus crossed the Atlantic in two months and 12 days. The first transatlantic steamship crossed in 26 days. In this age of mechanical perfection the same crossing takes less than 5 days. Because correct lubrication is such an important factor in the speed and reliability of these modern vessels—

53% of the world's ships of over 20,000 tons* use Gargoyle Marine Oils to lubricate their main power units

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The world-wide leadership of the Vacuum Oil Company in marine lubrication results solely from the high quality of its products and their scientific application.

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Marine Oils

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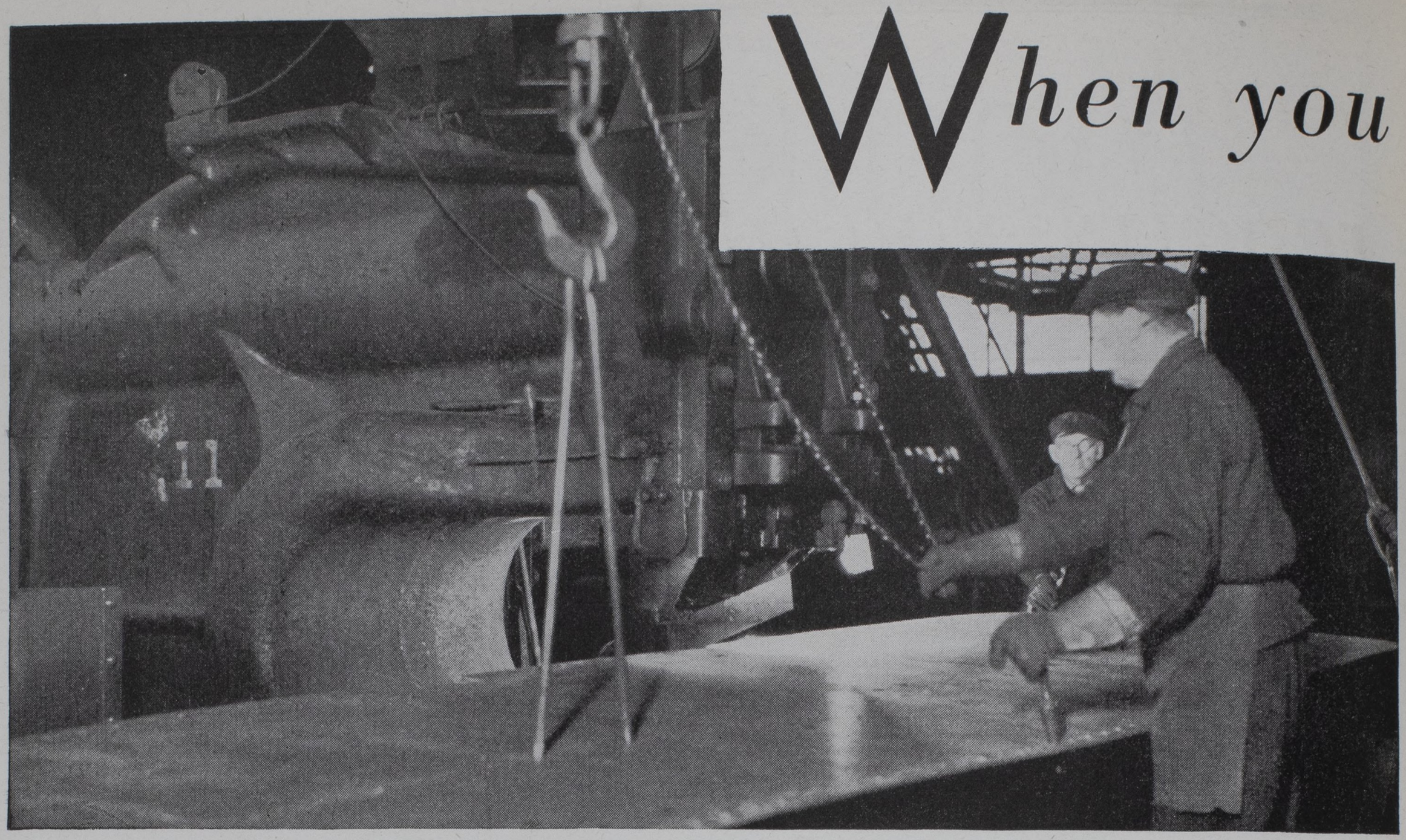
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Specialists in the manufacture of high-grade lubricants for every class of machinery. Obtainable everywhere in the world.

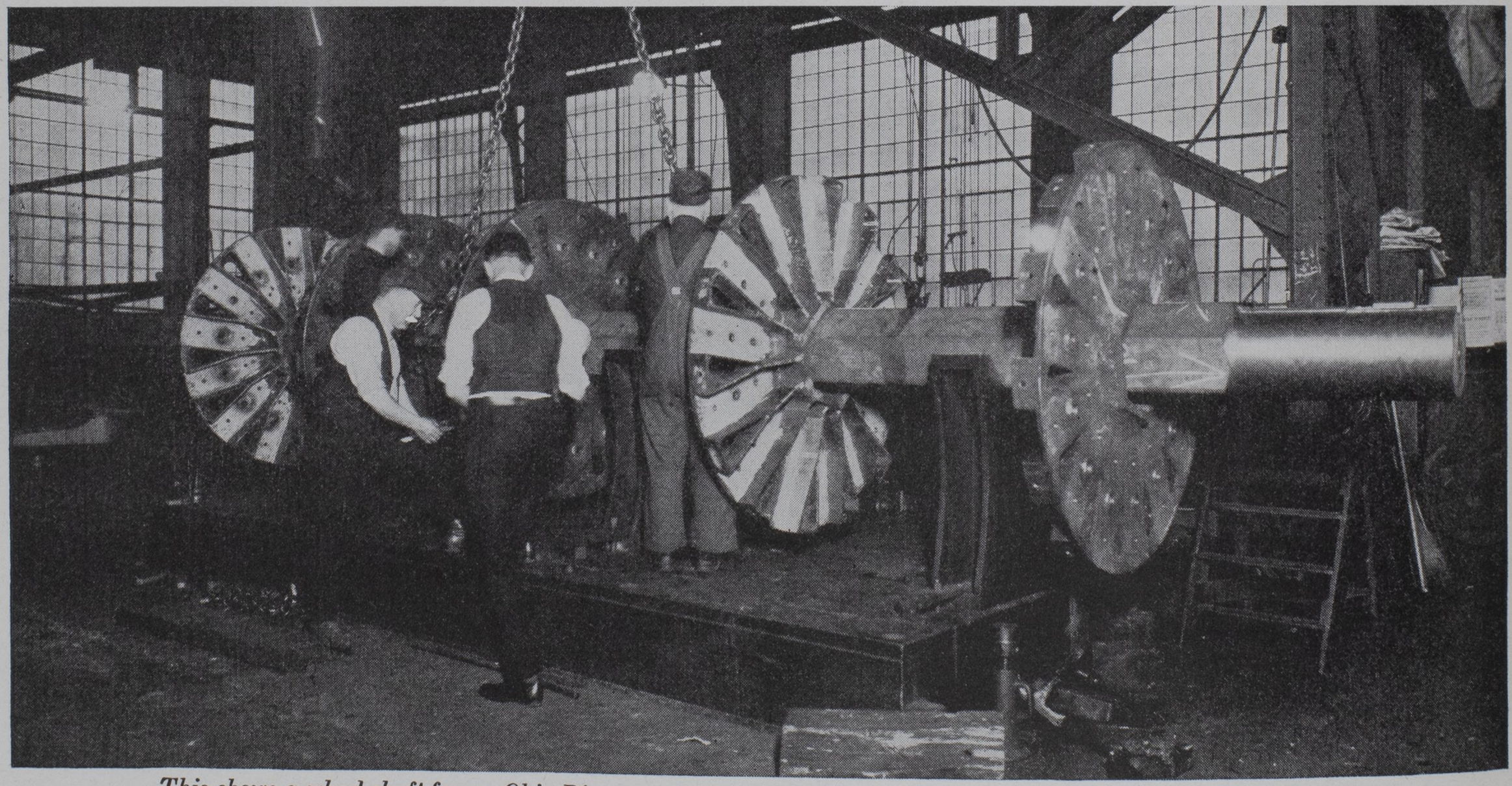
NOTE: We will be glad to send you, without obligation, either of our authoritative treatises—"Steamships with Reciprocating Engines" and "Marine Lubrication—Motorships." Address your request to: Vacuum Oil Company, Marine Sales Dept. D-4, 61 Broadway, New York City.

★ This includes all ships from 20,000 tons up to and including such giants as the Leviathan and the Majestic of almost 60,000 tons.

When you



Here the men are trimming a replacement plate, 5/8" thick, in the big shears in one of American's punch shops. These shears cut metal up to 1½" thick almost as easily as their smaller brothers cut paper. About sixty such plates, trimmed on two sides, is a day's output for the men—the machine is tireless. Many other facilities and capable workmen enable us to sustain, with every job, our reputation for utterly dependable work.



This shows a wheel shaft for an Ohio River steamer, set up for rough checking on the assembling block in one of our machine shops. The five-foot wheels were designed to take paddles eight feet long. The shaft alone is 26' 10" long and 12" in diameter. This is a typical American Ship job, entrusted to us because the owner realized that good work costs less in the long run.

The AMERICAN

CLEVELAND
American Ship Building Co.

LORAIN
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BUFFALO
Buffalo Dry Dock Company

send a ship to AMERICAN *for repairs, you always get a good* . . . DEPENDABLE JOB

FOR over thirty years "American Ship" has been delivering *good* repair work to satisfied customers; jobs with that plus-value which builds up confidence; jobs worth every cent they cost and more.

American delivers such completely reliable work because American has, concentrated in each of its five strategically located ship yards on the Great Lakes, large, modern, complete ship building and repair facilities, easily capable of handling any size repair job, swiftly, efficiently.

And we back these facilities with skilled and seasoned manpower —men from the great shipyards of Glasgow and the Clyde, salt-water Yankees and men trained in our own shops; men who know and love ships, men who *know* there is only *one* way to do a job —the best way.

Because our customers realize these facts, most of them stick to us and swear by us, year in and year out. And each year other ship operators are deciding that *good* repair work is vastly more important than low price. So, more and more, ship operators are sending all their repair jobs—big and little—to American.

SHIP BUILDING CO

SOUTH CHICAGO
Chicago Ship Building Co.

SUPERIOR
Superior Shipbuilding Co.

SHARPLES SAILS

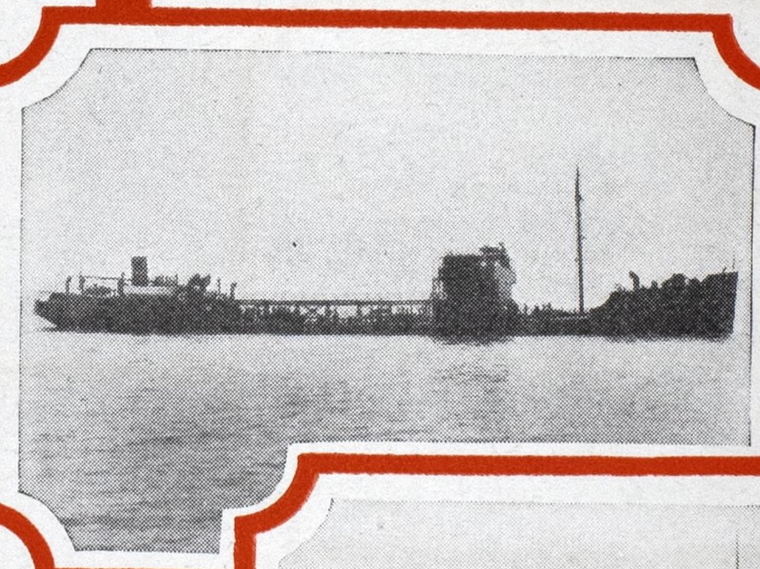


S. S. PENNSYLVANIA



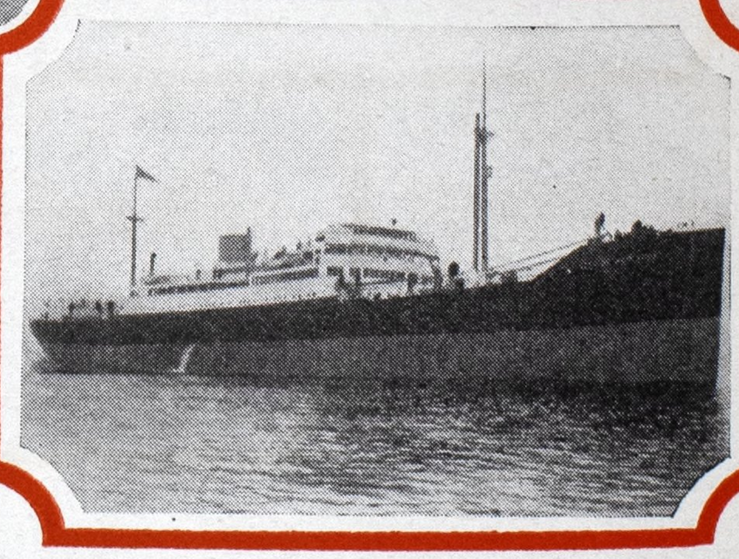
"PRESURTITE"
FUME-PROOF
SUPER
CENTRIFUGE

A GREAT FORCE



M. S.
TIDEWATER

CITY OF
NEW YORK



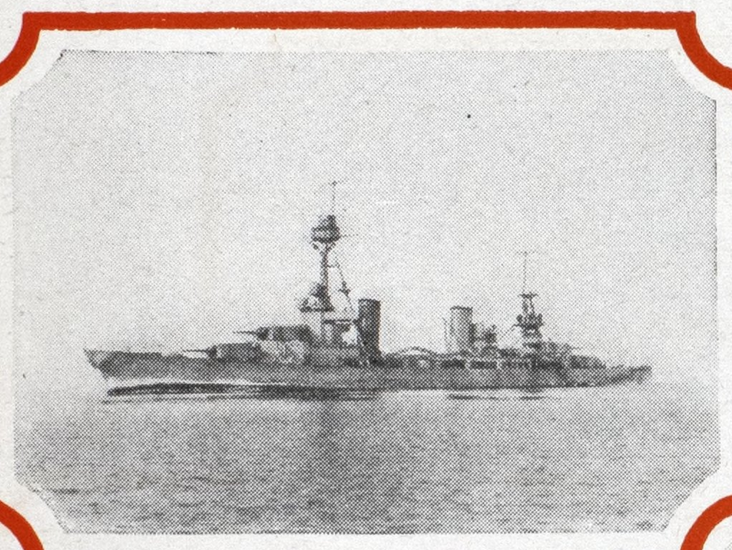
Here are a few of the outstanding American built ships laid down or completed in 1929, fitted with oil purifiers made by the Sharples Specialty Company of Philadelphia:

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U. S. S. SALT LAKE CITY
U. S. S. PENSACOLA
M. S. SUN
M. S. TIDEWATER
M. S. TRIUMPH
S. S. BERWIND VALE
M. S. SUN OIL
M. S. NO NOX
CITY OF NEW YORK
M. S. DEFIANCE
M. S. PACIFIC SUN
S. S. SANTA CLARA

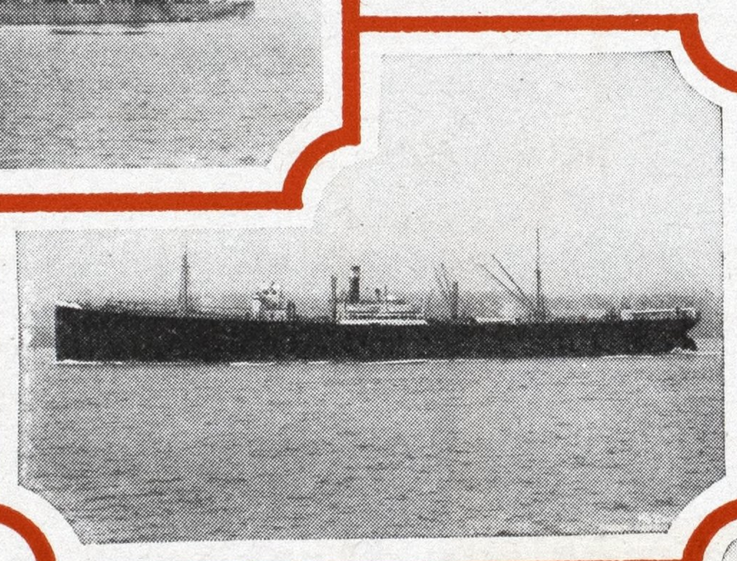
THE SHARPLES

THE SEVEN SEAS

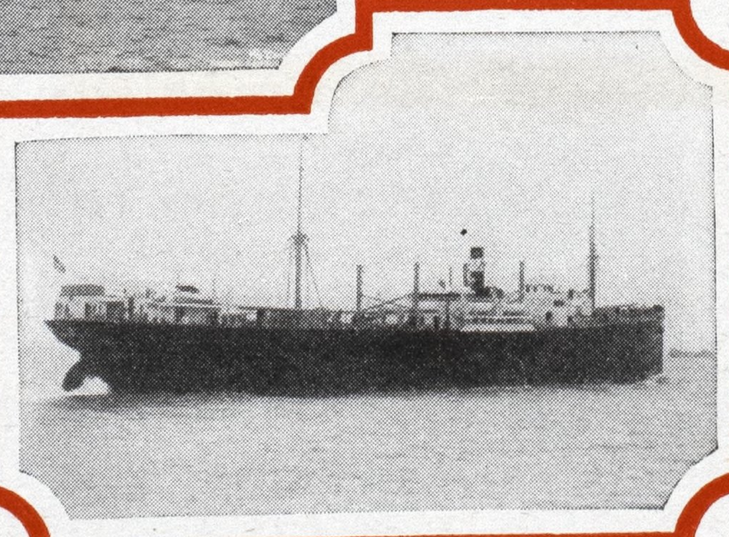
The outstanding centrifugal installations in the marine field are Sharples. The Sharples Super Centrifuge today stands supreme on the seas—the finest, most efficient oil purifier that engineering skill can produce. Sharples Simplicity—combined Super Centrifugal Force (13,200 times gravity)—has won the approval and choice of the world's great engine builders, shipping and marine powers. Only Sharples has the easy-to-clean tubular bowl—complete freedom from complicated internal mechanism—and the highest centrifugal force and purifying power ever commercially used and universally proven.



U.S.S.
SALT LAKE CITY

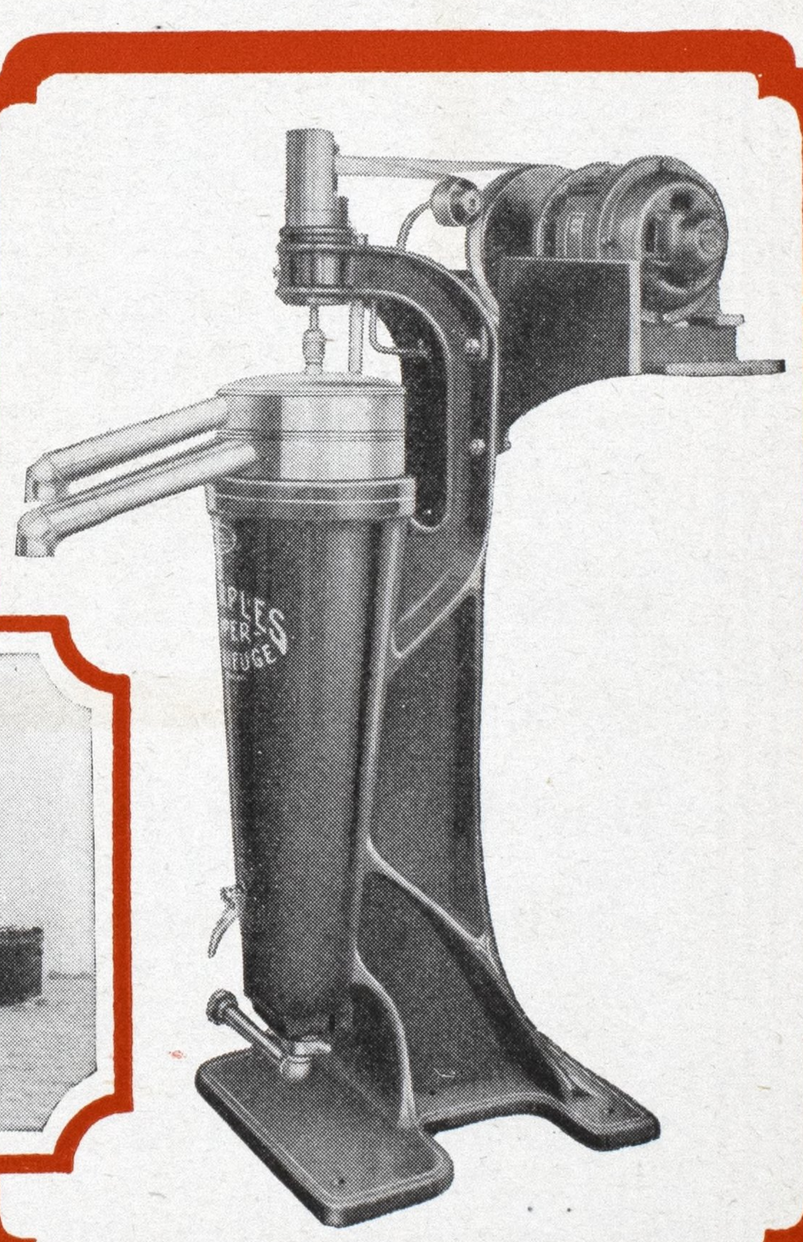


M.S.
TRIUMPH



M.S. DEFIANCE

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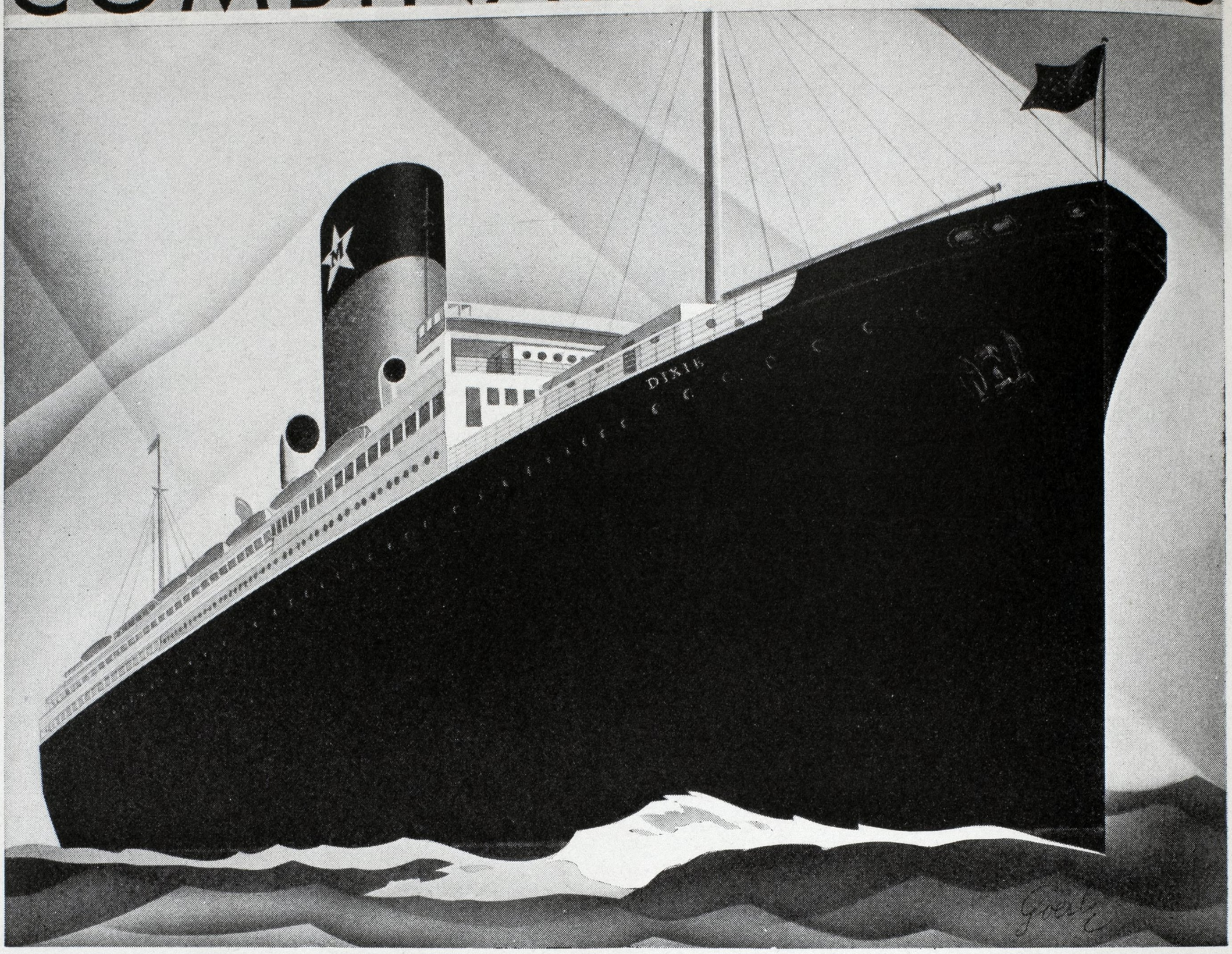
THE SHARPLES SPECIALTY COMPANY
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FEDERAL BUILDS GOOD SHIPS

COMBINATION SHIPS



S. S. "Dixie," built for the Southern Pacific Steamship Lines, was the first American merchant ship equipped with high efficiency geared turbines and water tube boilers, operating at 350 lbs. pressure and total temperature of 630° F. Accomodations for 333 passengers are provided, also modern cargo handling equipment. The ship, after two years operation, meets all the expectations of the owners.

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...To assure complete success of this important feature, Federal became affiliated several years ago with the well established joiner organization which had performed such outstanding work on the steamship "Malolo" and has since been selected for the joiner work on the new 26,000 ton Matson liners.

FEDERAL SHIPBUILDING AND DRY DOCK COMPANY
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SUBSIDIARY OF UNITED STATES STEEL CORPORATION

Close Bulkhead Doors with a flip of the finger

WITH Cutler-Hammer Door Operating System every bulkhead door or opening is at finger-tip control of the officer in the pilot house. A chart flashes to him the position of every door—whether open, moving or shut. A throw of a switch starts any or all of the bulkhead doors to open or shut. No waiting for uncertain manual operation of each door. No lost time when *minutes* may mean *disaster.*

The C-H Control Unit is extremely simple. There is no elaborate mechanism to get out of order. A high-starting-torque motor at the door snaps on when the switch is thrown, makes one complete revolution before hitting the door mechanism with a sharp impact to free it and start it on its way.

C-H Door Operating System *permits and does not interfere with* manual operation. Two stations—one on either side of the opening itself and a master control switch in the pilot house—control each door. A sailor trapped by a bulkhead can release himself but the bulkhead door closes again immediately in response to the master control.

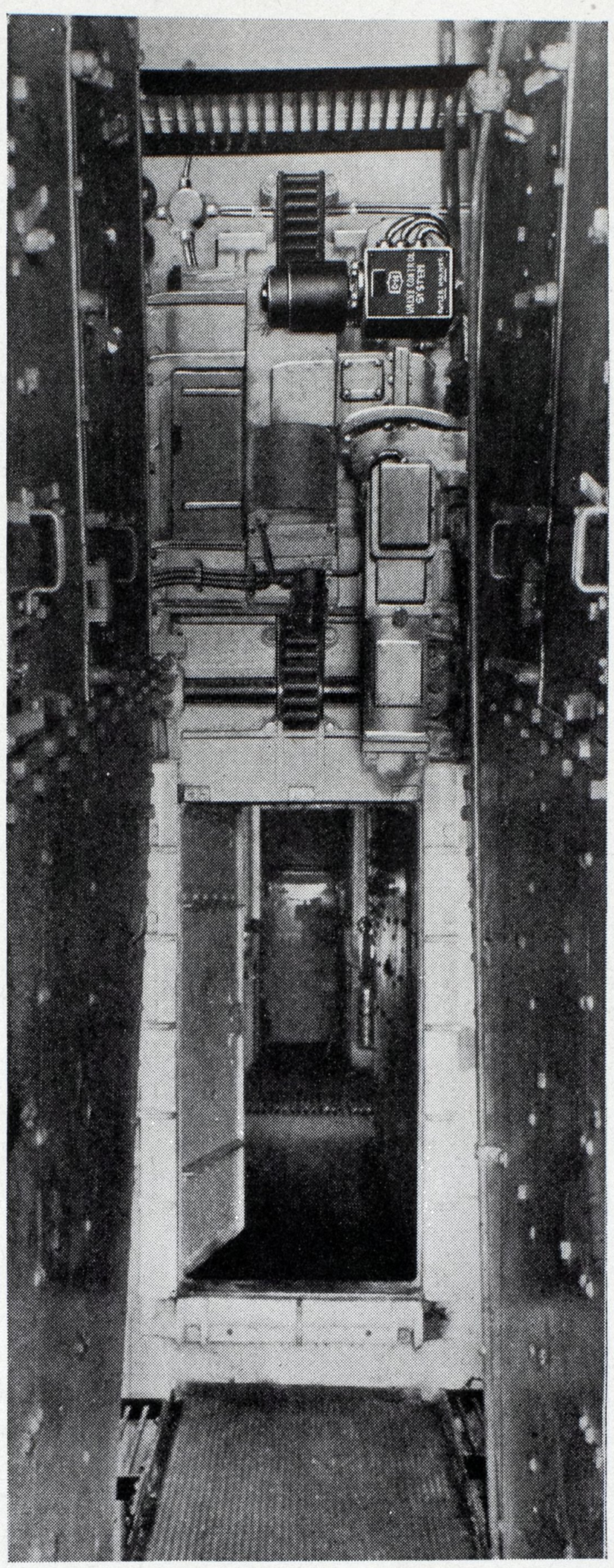
Specify C-H Door Operating System for every ship, large or small. The C-H System meets every requirement of the International Conference on Safety of Life at Sea and was installed on the *first U. S. vessel* to have motor controlled bulkhead doors. The long experience of C-H Engineers in problems of marine design is at your service. Ask for full details.

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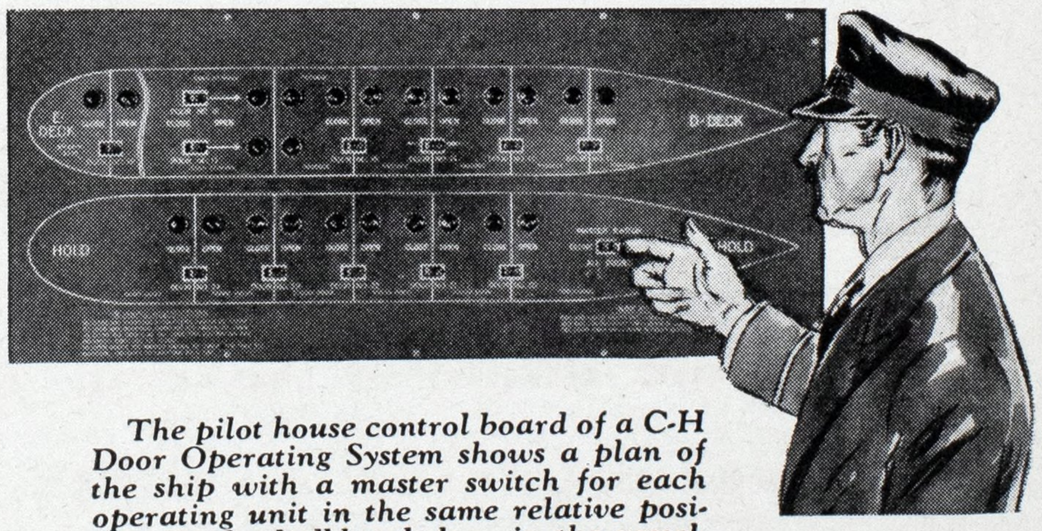
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C-H Bulkhead Door Operating System meets every requirement of the International Conference on Safety of Life at Sea.

C-H Door Operating System installed on the S. S. California of the Panama-Pacific S. S. Co., operates this vertical watertight door.



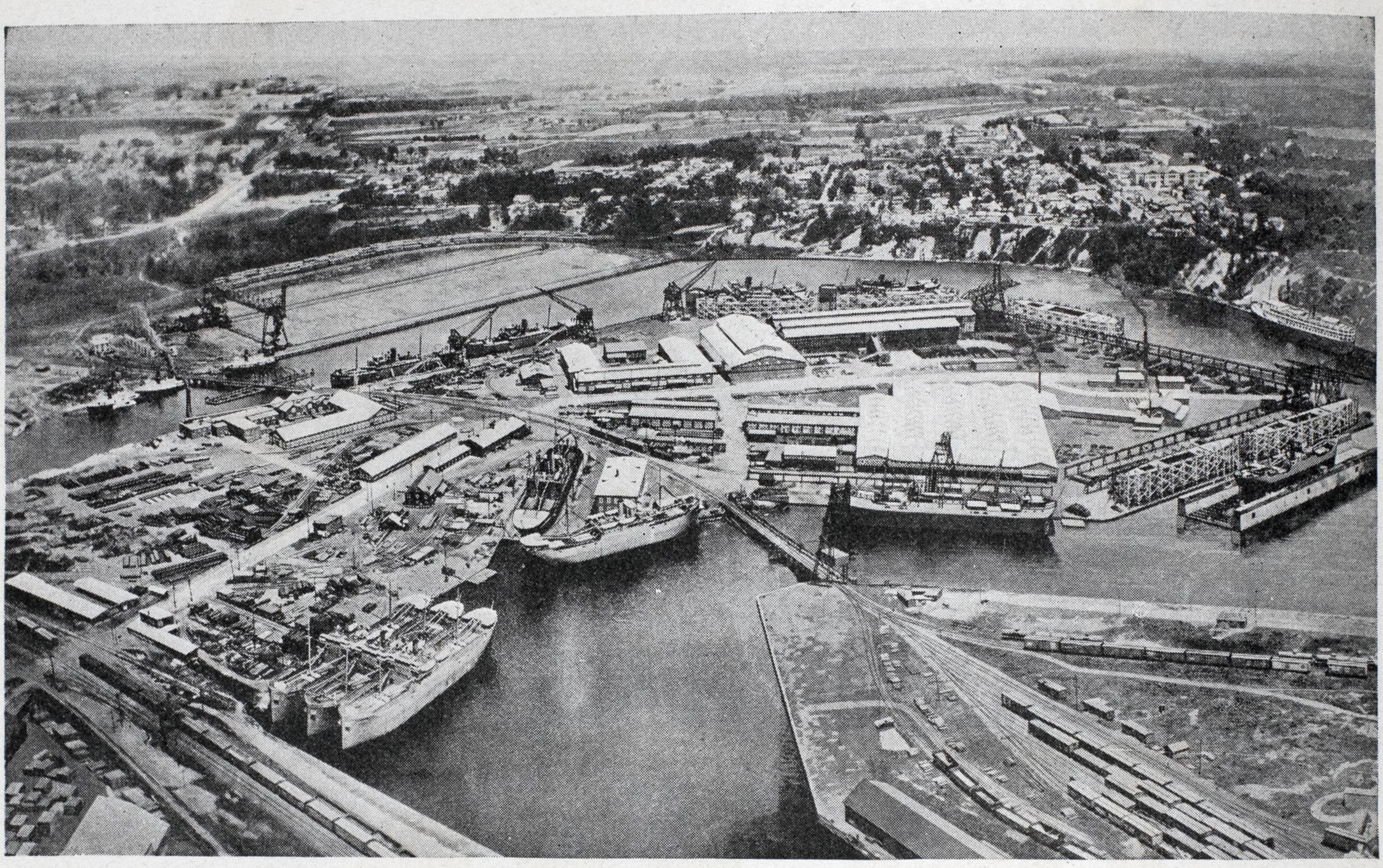
The pilot house control board of a C-H Door Operating System shows a plan of the ship with a master switch for each operating unit in the same relative position as the bulkhead door in the vessel. Lights at each switch indicate whether door is open, moving, or shut.

CUTLER HAMMER

Motor-Driven Bulkhead Door Operating Systems

(A316)

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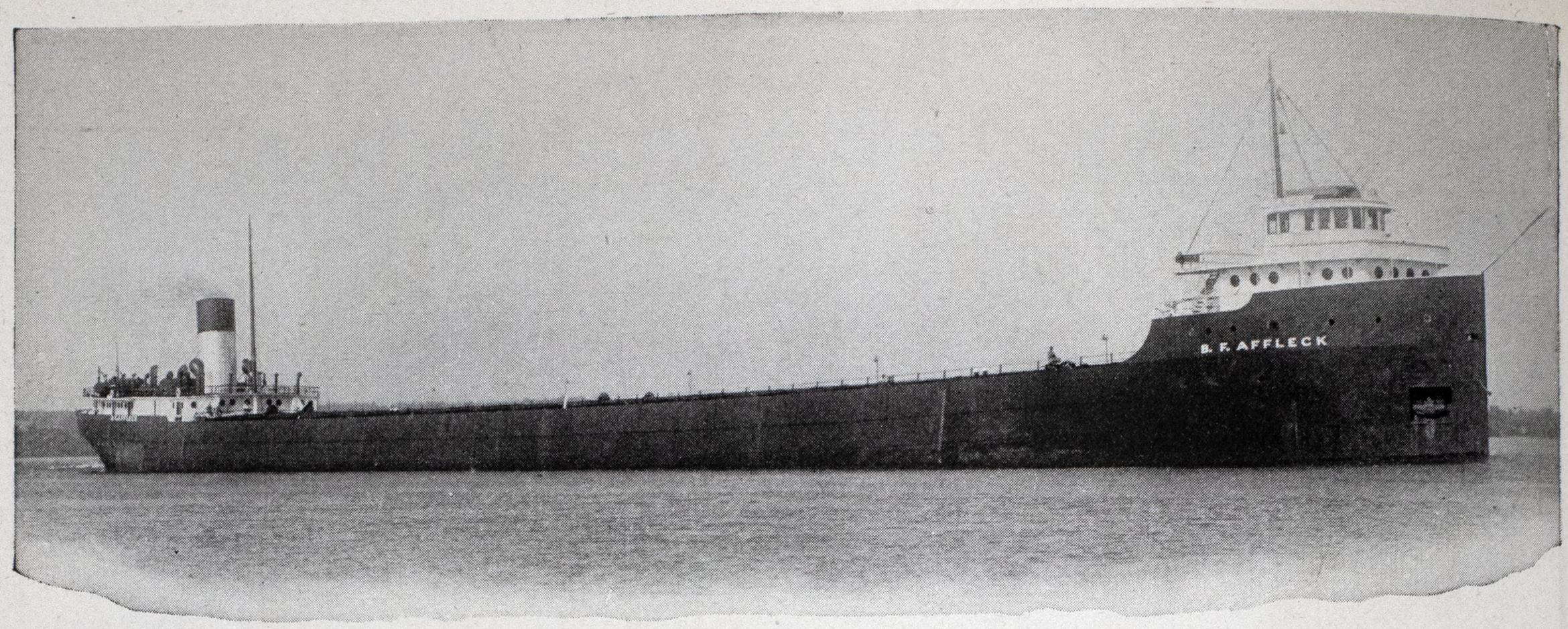
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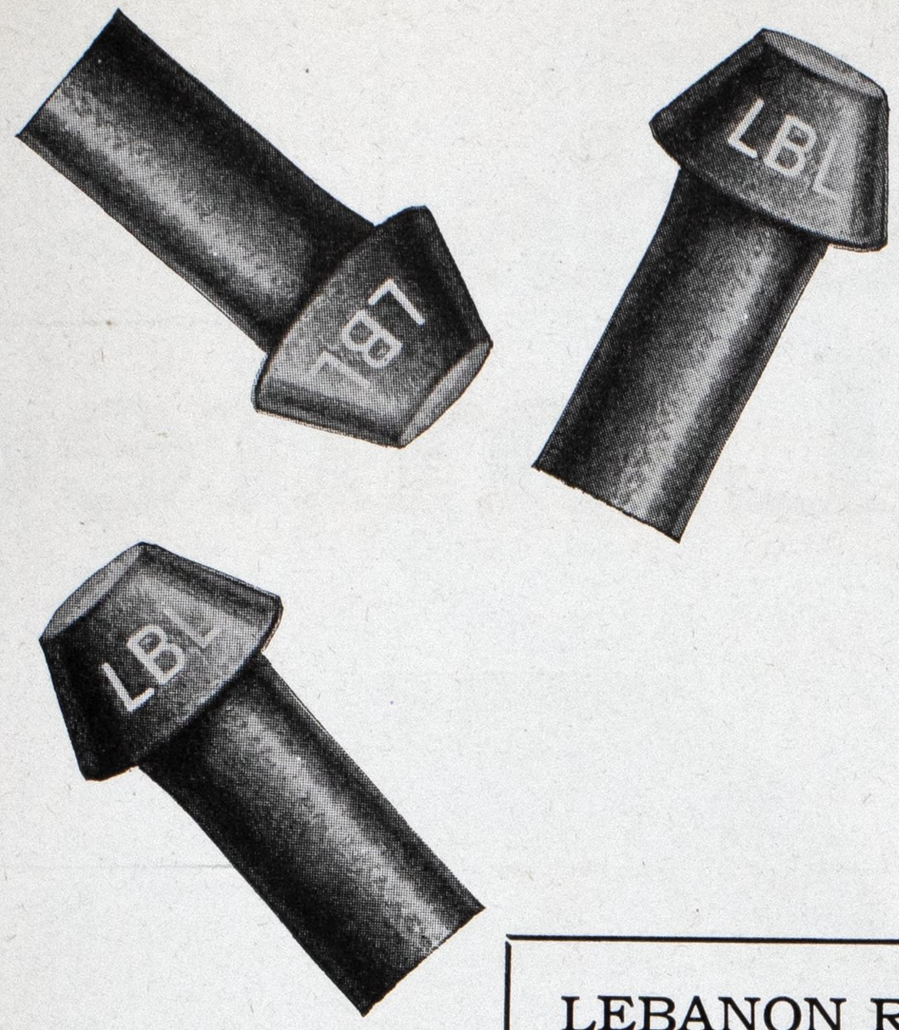
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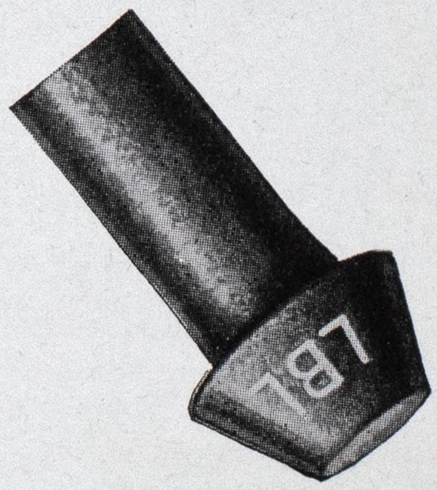
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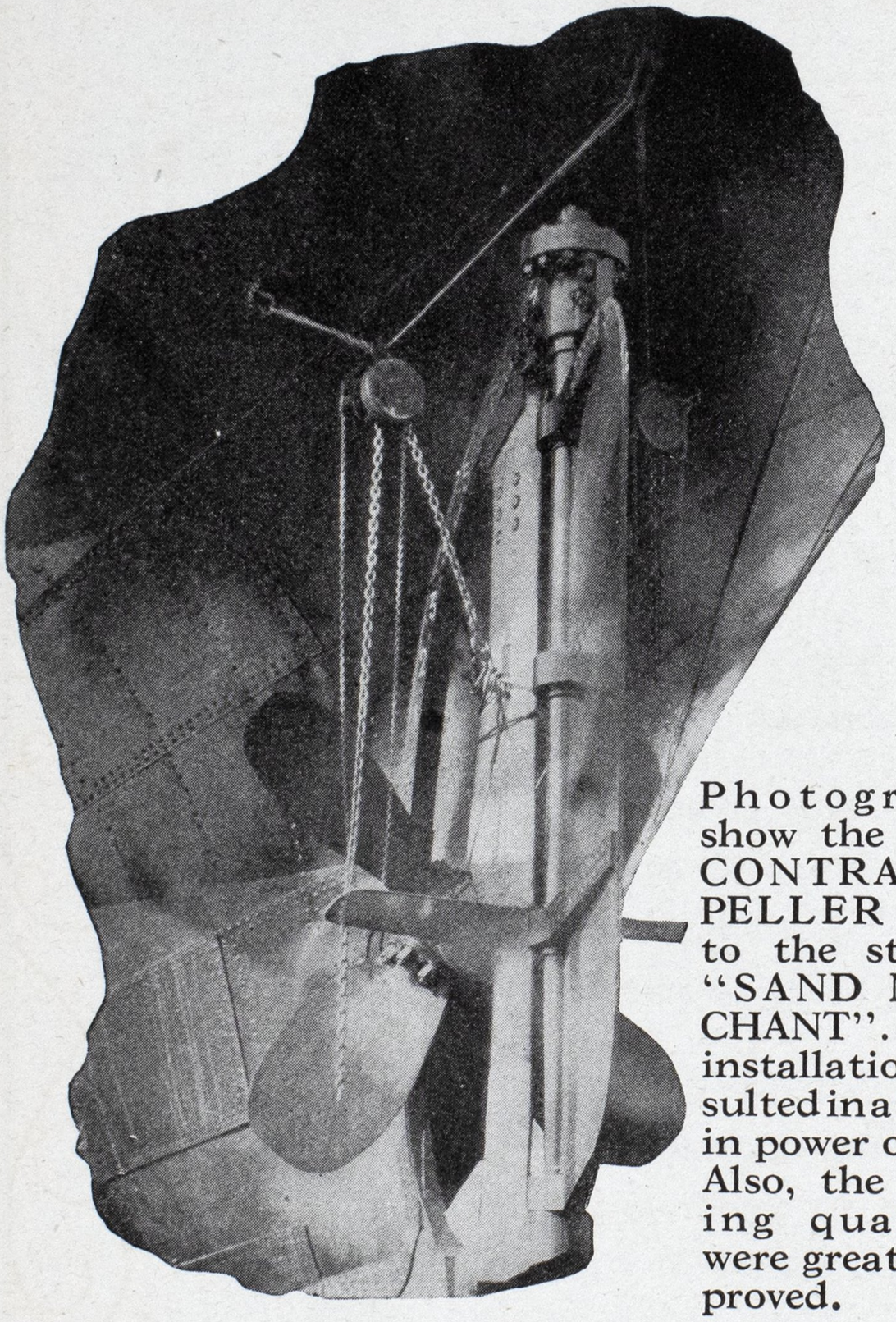
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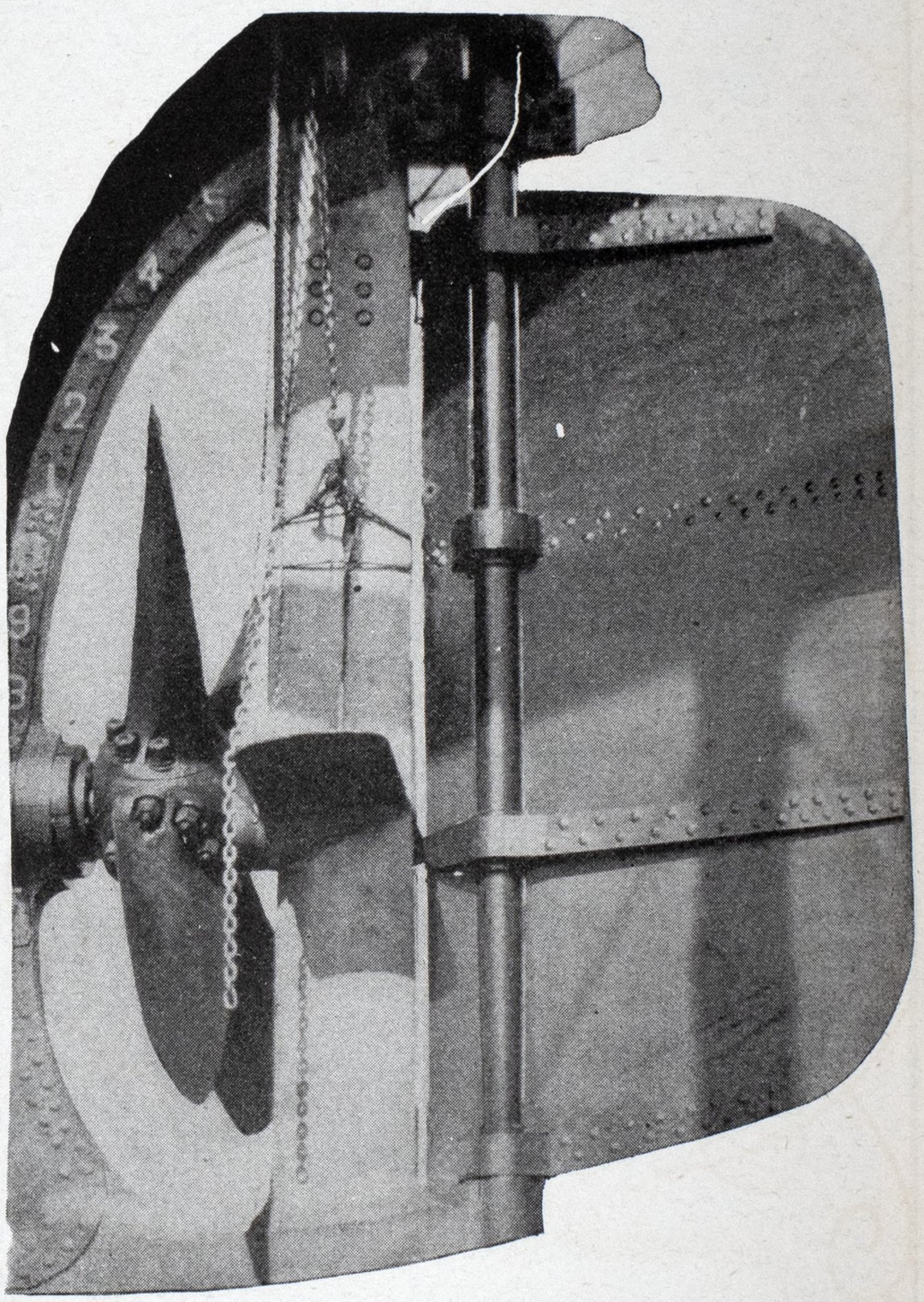
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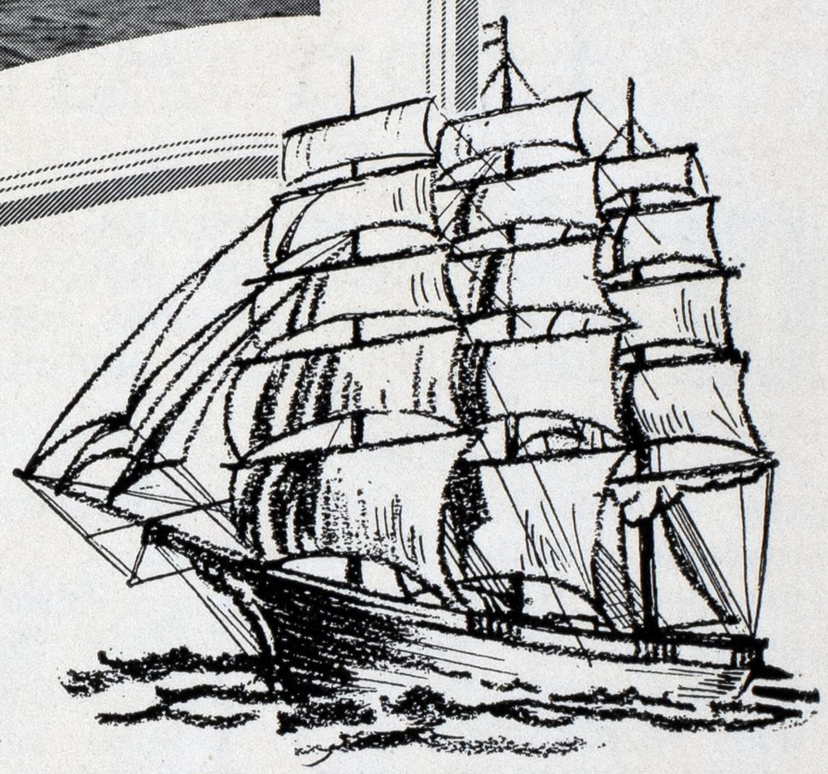
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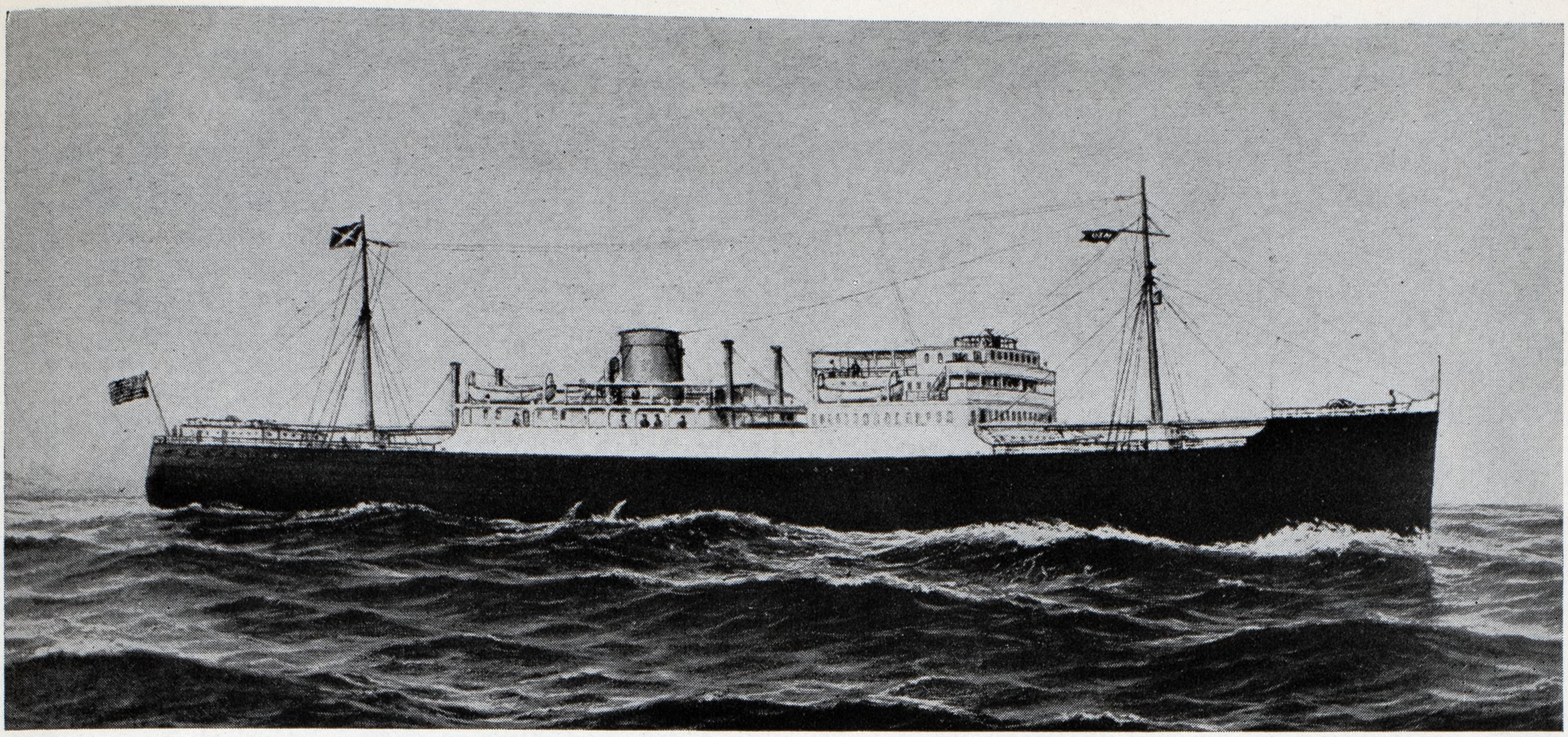


Marine Progress

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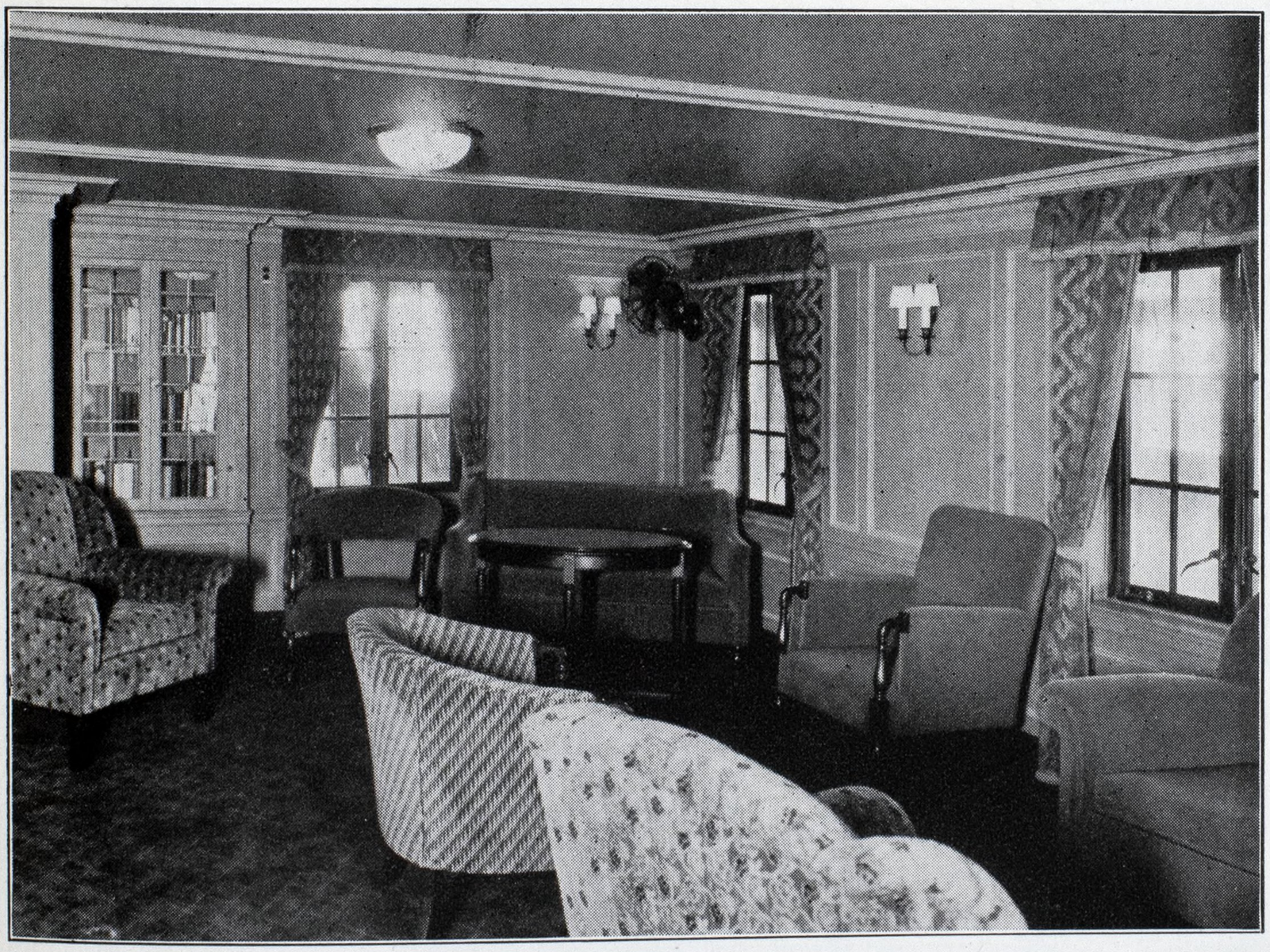
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Hull 113	Federal Shipbuilding and Dry Dock Co.	Standard Shipping Co.
Hull 114	Federal Shipbuilding and Dry Dock Co.	Standard Shipping Co.
City of Saginaw	Manitowoc Shipbuilding Corp.	Pere Marquette Railway Co.
City of Flint	Manitowoc Shipbuilding Corp.	Pere Marquette Railway Co.
Violet	Manitowoc Shipbuilding Corp.	U. S. Department of Commerce
Morro Castle	Newport News Shipbuilding and Dry Dock Co.	Ward Line
Oriente	Newport News Shipbuilding and Dry Dock Co.	Ward Line
Pennsylvania	Newport News Shipbuilding and Dry Dock Co.	Panama-Pacific Line
Santa Clara	New York Shipbuilding Co.	Grace Line
Salt Lake City	New York Shipbuilding Co.	U. S. Navy
Chester	New York Shipbuilding Co.	U. S. Navy
Hull 394	New York Shipbuilding Co.	Export Steamship Co.
Hull 395	New York Shipbuilding Co.	Export Steamship Co.
Hull 396	New York Shipbuilding Co.	Export Steamship Co.
Hull 397	New York Shipbuilding Co.	Export Steamship Co.
City of New York	Sun Shipbuilding and Dry Dock Co.	American South African Line
Pacific Sun	Sun Shipbuilding and Dry Dock Co.	Motor Tankship Corp.
Chester Sun	Sun Shipbuilding and Dry Dock Co.	Motor Tankship Corp.
Hull 123	Sun Shipbuilding and Dry Dock Co.	Motor Tankship Corp.
Hull 124	Sun Shipbuilding and Dry Dock Co.	Motor Tankship Corp.
Hull 125	Sun Shipbuilding and Dry Dock Co.	Tidewater Oil Co.
Hull 126	Sun Shipbuilding and Dry Dock Co.	Tidewater Oil Co.
Hull 184	Toledo Shipbuilding Co.	Pittsburgh Steamship Co.
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Hull 960	Dravo Contracting Co.	Standard Unit Navigation Co.
Hull 961	Dravo Contracting Co.	Standard Unit Navigation Co.
Hull 136	Dubuque Boat & Boiler Works	Inland Waterways Corp.
Hull 137	Dubuque Boat & Boiler Works	Inland Waterways Corp.
Rene	Pusey & Jones Corp.	Alfred P. Sloan, Jr.
Nakhoda	Pusey & Jones Corp.	Fred J. Fisher
Cambriona	Pusey & Jones Corp.	Walter Briggs
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Hull 794	United Dry Docks	B. & O. Railroad Co.
Hull 795	United Dry Docks	City of New York
Dwight F. Davis	Charles Ward Engineering Works	Inland Waterways Corp.
Hull 83	Charles Ward Engineering Works	Standard Unit Navigation Co.
Hull 84	Charles Ward Engineering Works	Standard Unit Navigation Co.
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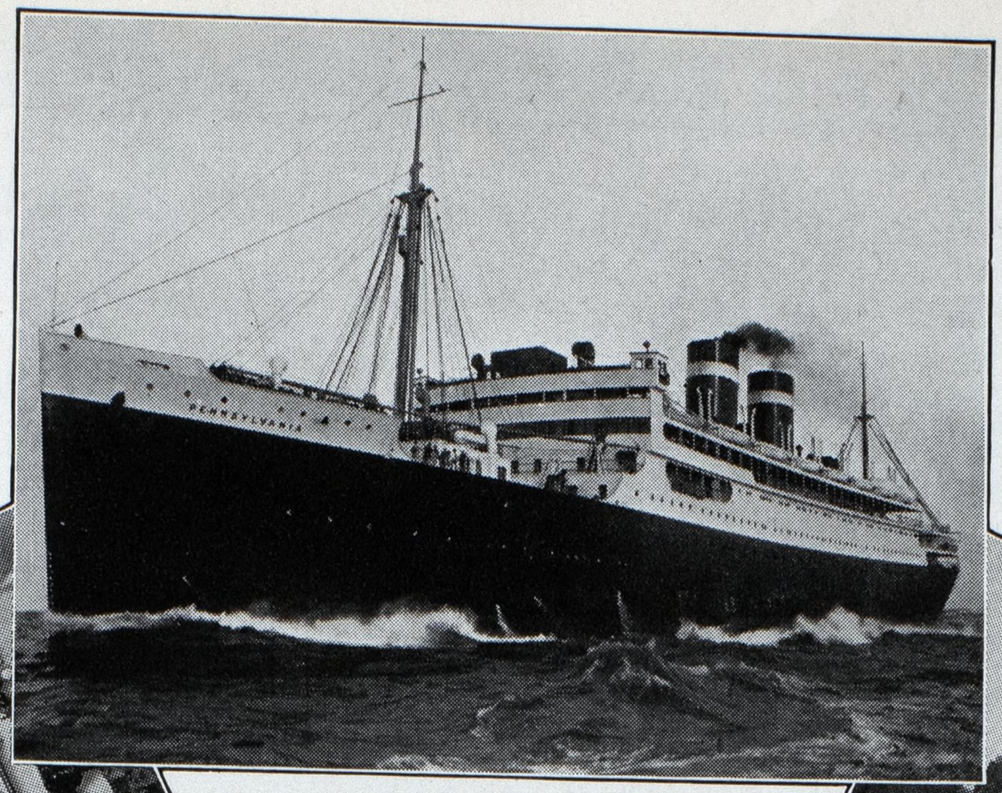
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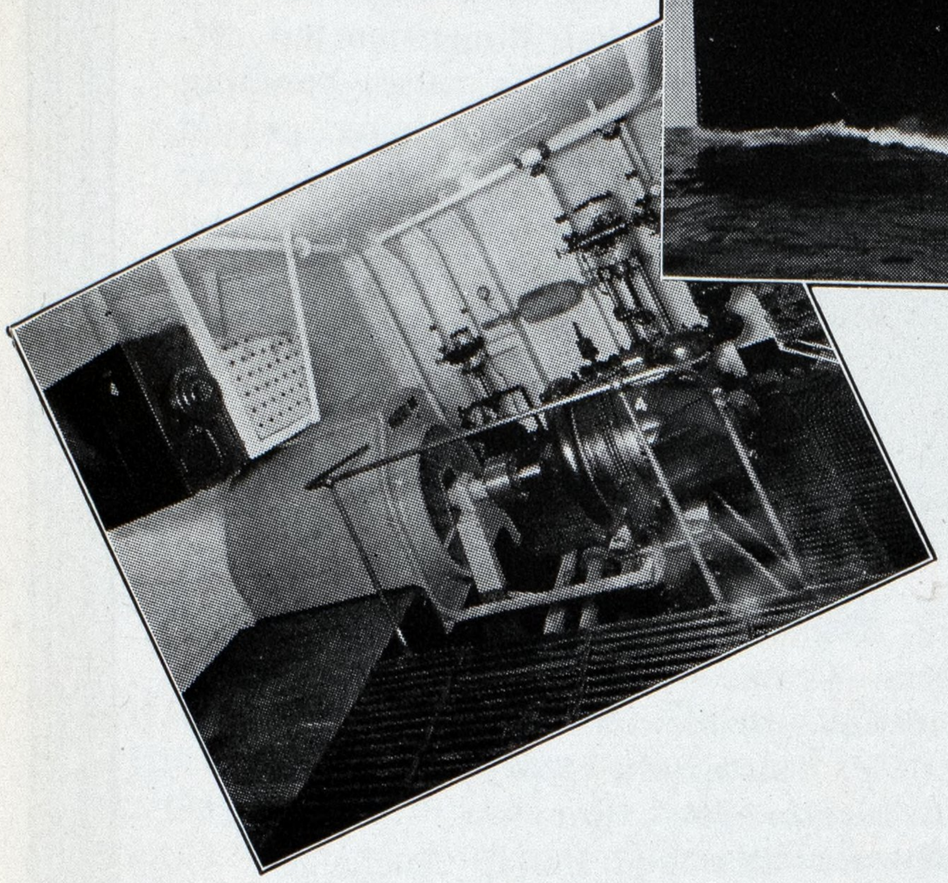
G-23

S. S. Pennsylvania of the Panama Pacific Line built by Newport News S. B. & D. D. Co., Newport News, Va

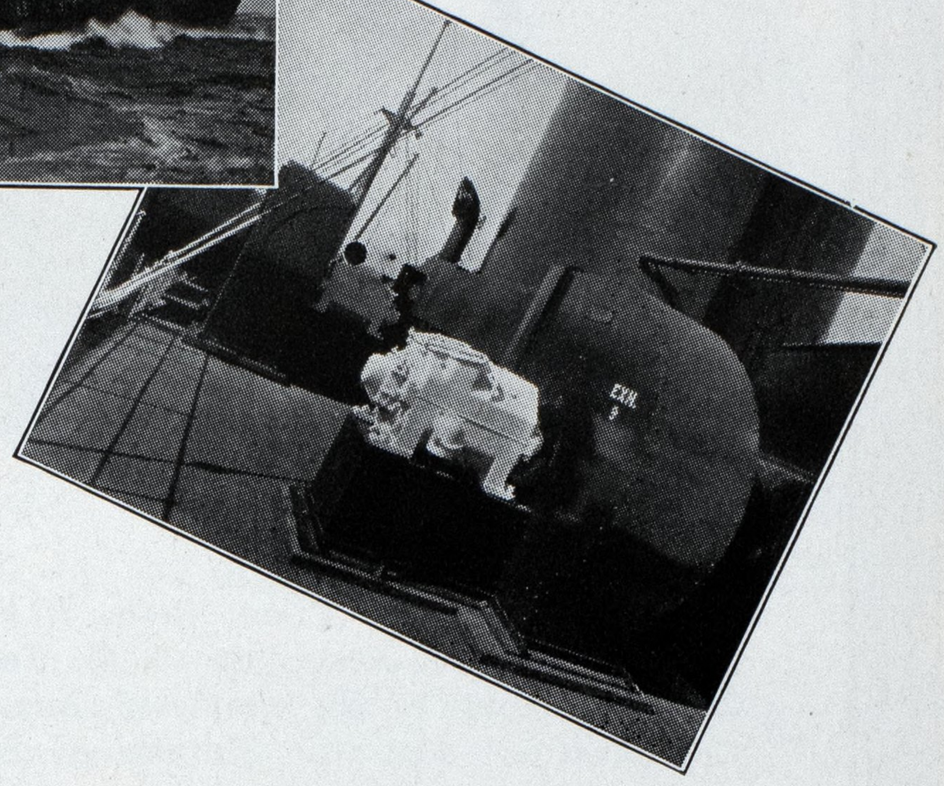


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Sturtevant Forced Draft Blowers installed on the S. S. Pennsylvania.



Sturtevant Ventilating Fans installed on deck of the S. S. Pennsylvania.



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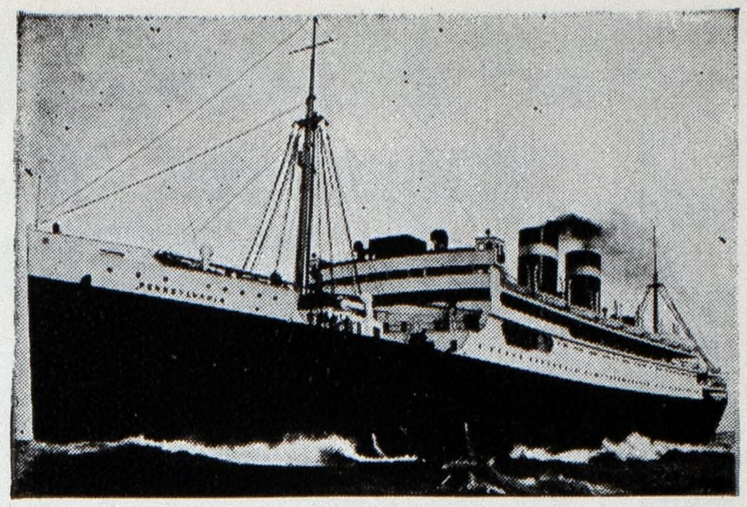
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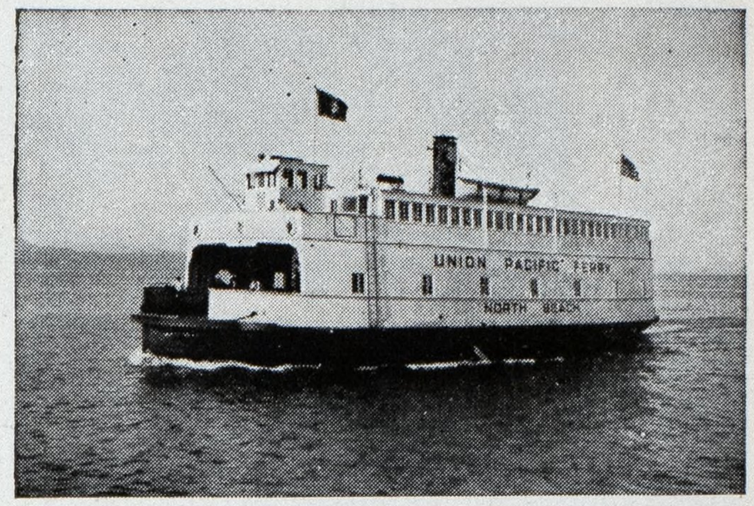
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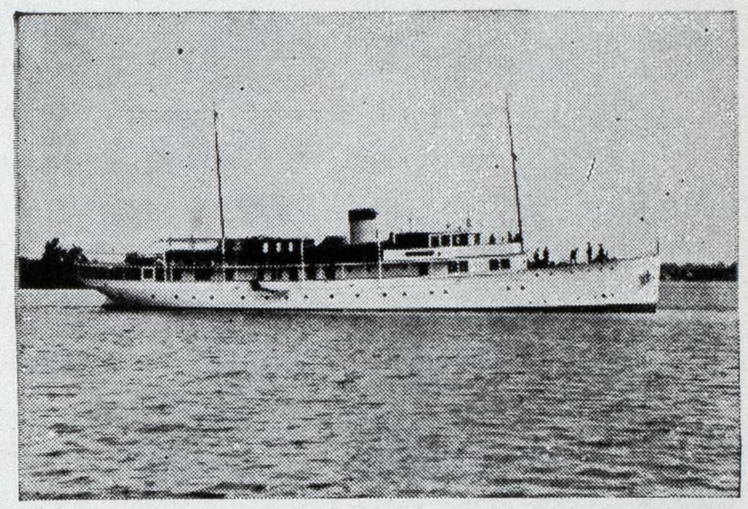
You can rely on Exide-Ironclad Marine Batteries to give perfect service steadily, dependably, and *economically.* And it's worth your while to get the facts about Exides and their application in your particular marine field. Write NOW. We will gladly send you the latest bulletins. Furthermore there's an Exide representative in almost every important coast and inland port who can give you valuable information. There is no obligation whatsoever.



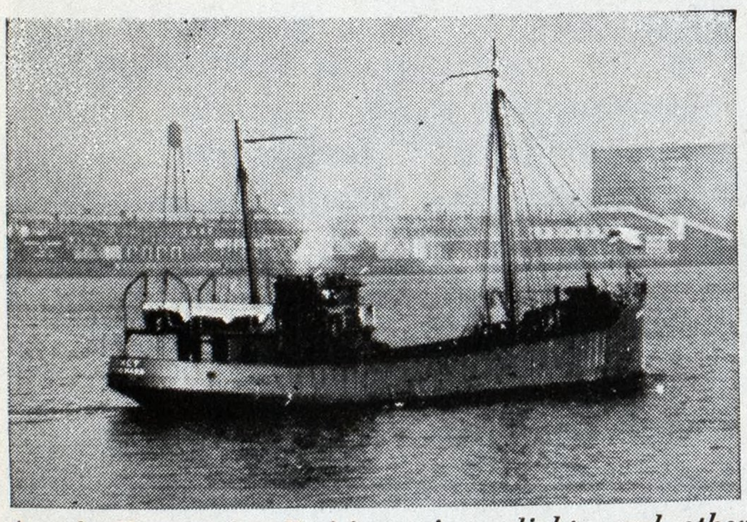
Great Ocean Liners *depend on Exide-Ironclads for steady, economical electric current in emergencies.*



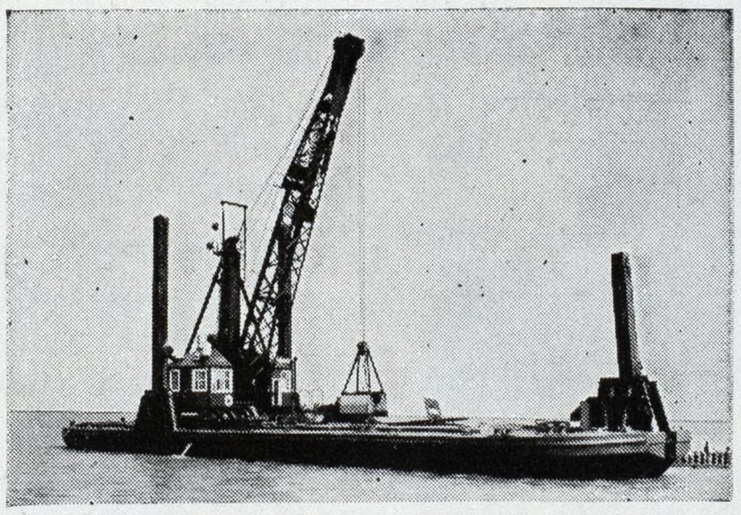
For the Daily Grind, *ferries require efficient, continuous electric power for lighting and auxiliaries. Exide-Ironclads do the job easily.*



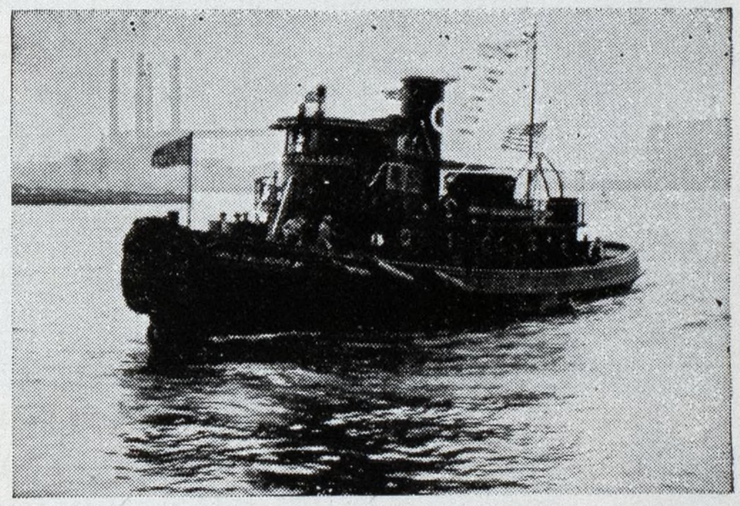
Majority of All Yachts over 100 feet *built in 1929 rely on Exide-Ironclad Marine Batteries for trouble-free, dependable current.*



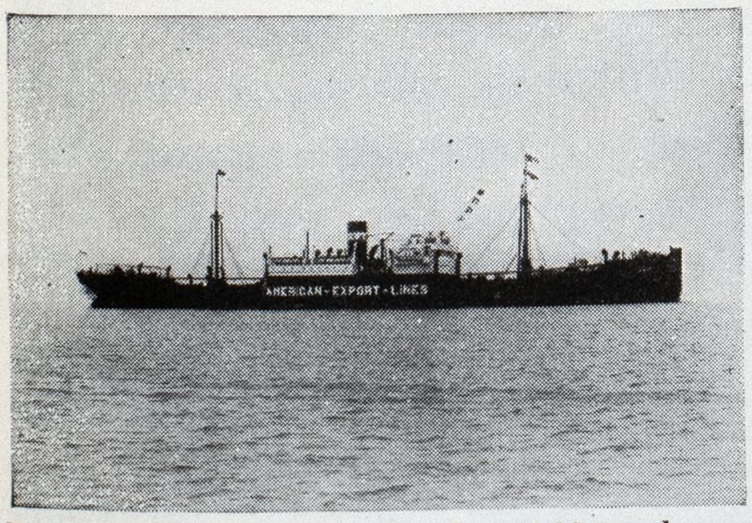
Ample Power for Refrigeration, *lights and other uses. That's what Exides give to fishing boats. These batteries furnish auxiliary power for every need.*



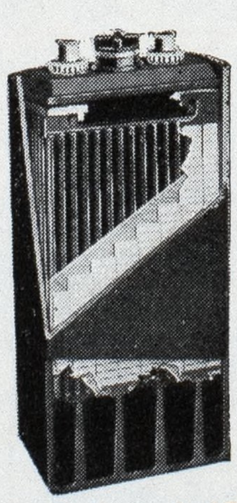
For Diesel Powered Dredges, *Exide-Ironclads supply steady electric current for lighting and auxiliaries whenever necessary.*



For Heavy Duty Diesel Tugs, *Exide-Ironclads operate all auxiliaries when necessary . . . built for gruelling service under any conditions.*



For Freighters, *Exides are dependable and economical. Their rugged construction and long life keep them on the job, ready for duty at all times.*



Exide-Ironclad Battery *cell cut away to show construction.*

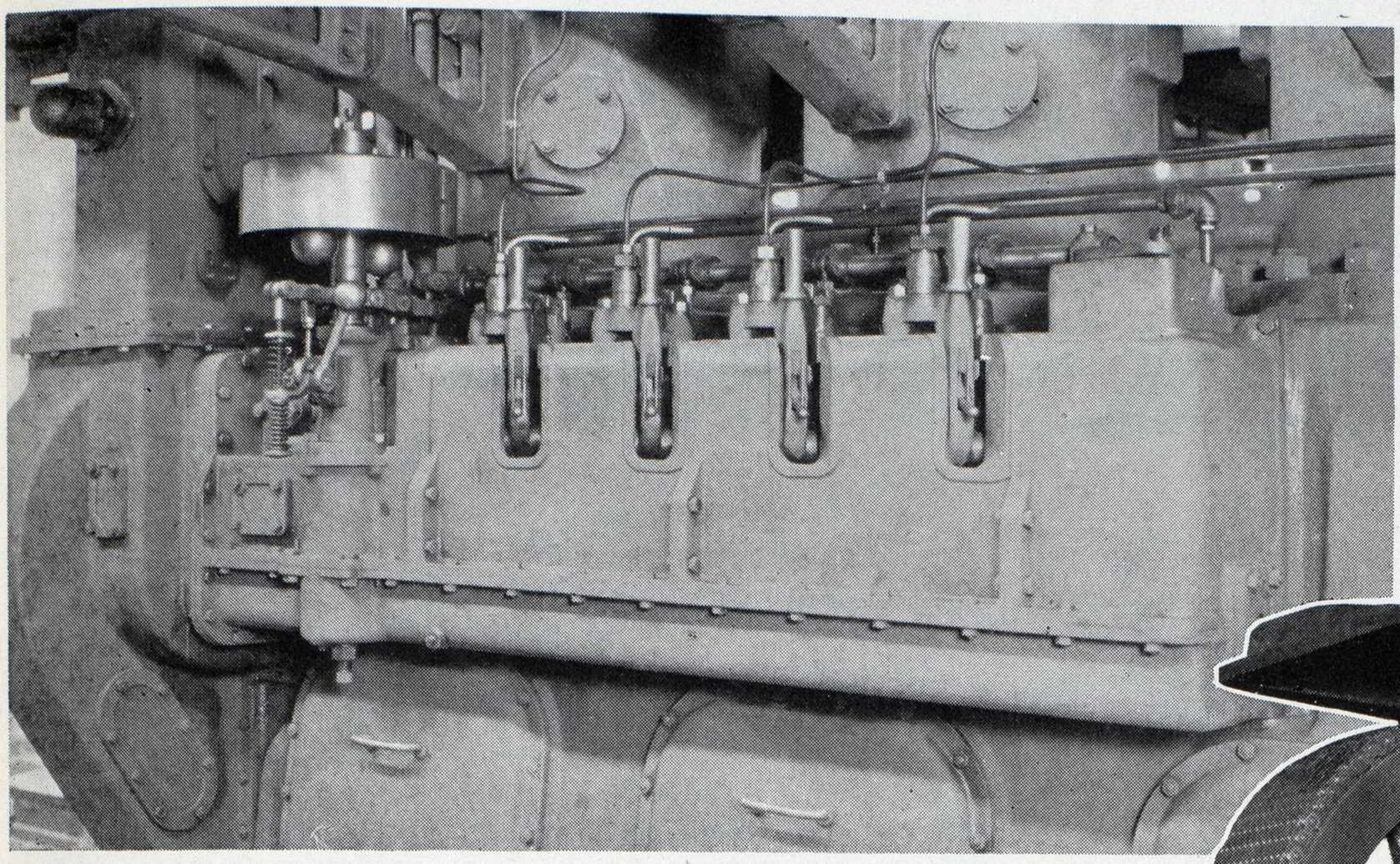
Exide
IRONCLAD
MARINE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

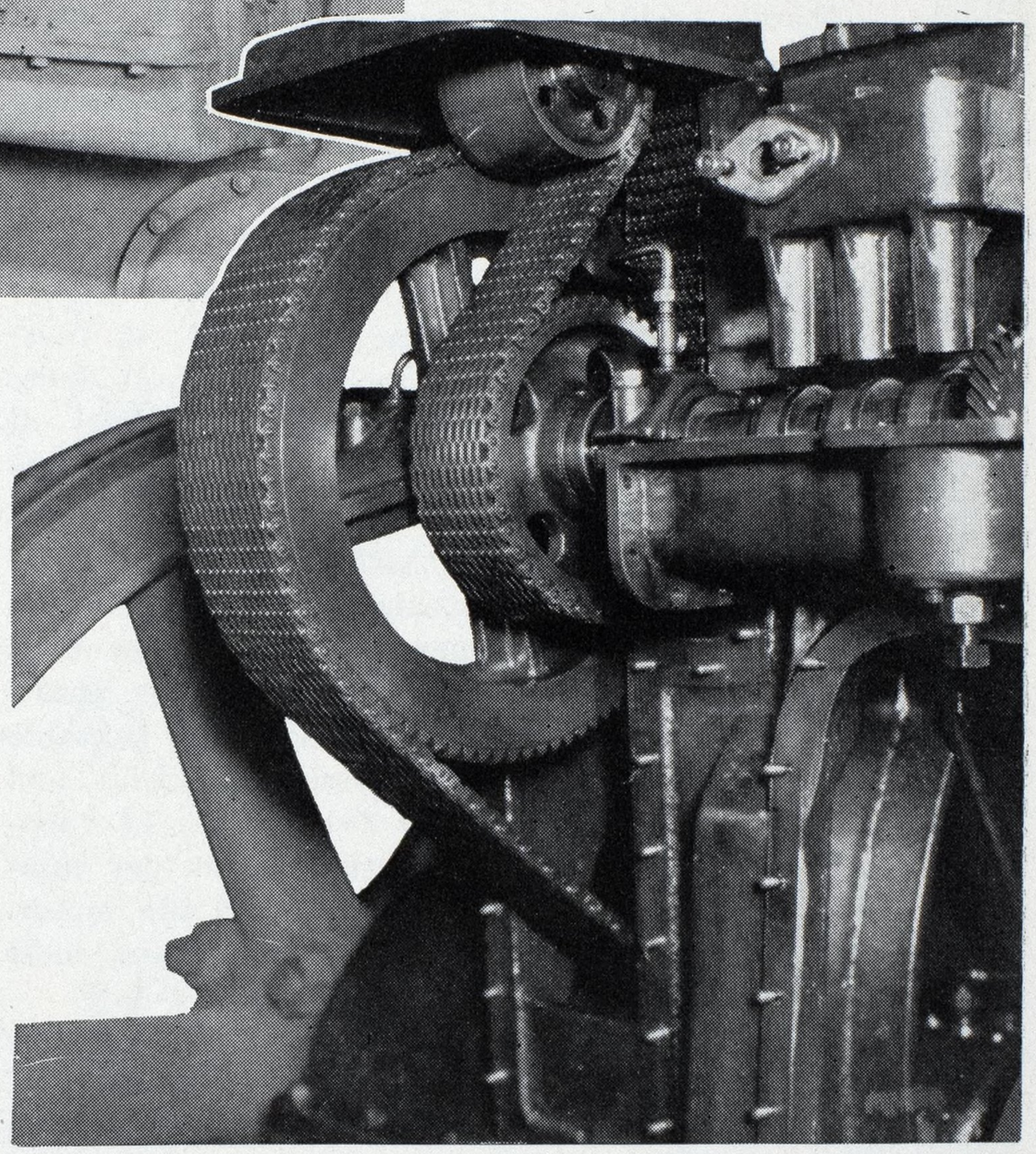
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

De La Vergne Diesel Engines in the M. S. Tidewater



Showing simplicity and accessibility of starting and operating mechanism.



Silent chain drive for timing gear.

THE reliable and economical operation of the De La Vergne Diesel engine in stationary service makes its entrance into the marine field a natural result. The success of our first sea-going installation—the M. S. "TIDEWATER"—resulted in a duplicate order from the Tide Water Oil Company. The second vessel is now building at the Pusey & Jones Yard in Wilmington, Delaware, and will go into service in the spring of 1930.

The engines in the M.S. "TIDEWATER" are 6-cylinder, 625 B. HP., rotating at 225 r.p.m., and operate on the De La Vergne solid injection principle. Aside from advantages inherent in this system of fuel injection, the engines are extremely quiet as a result of close tolerances in all working parts and the use of silent chain driven camshafts.

DE LA VERGNE engines are built for Diesel electric drive in sizes from 250 B. HP. to 1500 B. HP. and for direct reversing in 6 and 8-cylinder engines in the following sizes: 400, 535, 600, 660, 800, 880, 1140 and 1500 B. HP.

I. P. MORRIS & DE LA VERGNE, INC.

RICHMOND & NORRIS STS., PHILADELPHIA, PA.

Recent Warren Contracts



4 Export Liners - - - 100 Warren Pumps



2 Dollar Liners - - - 78 Warren Pumps



2 Sinclair Tankers - - - 26 Warren Pumps



4 C. G. Cutters [50, 51, 52, 53.] - - - 40 Warren Pumps



Yacht Corsair - - - 19 Warren Pumps

Such consideration must be deserved

Warren

Steam Pump Company Inc.

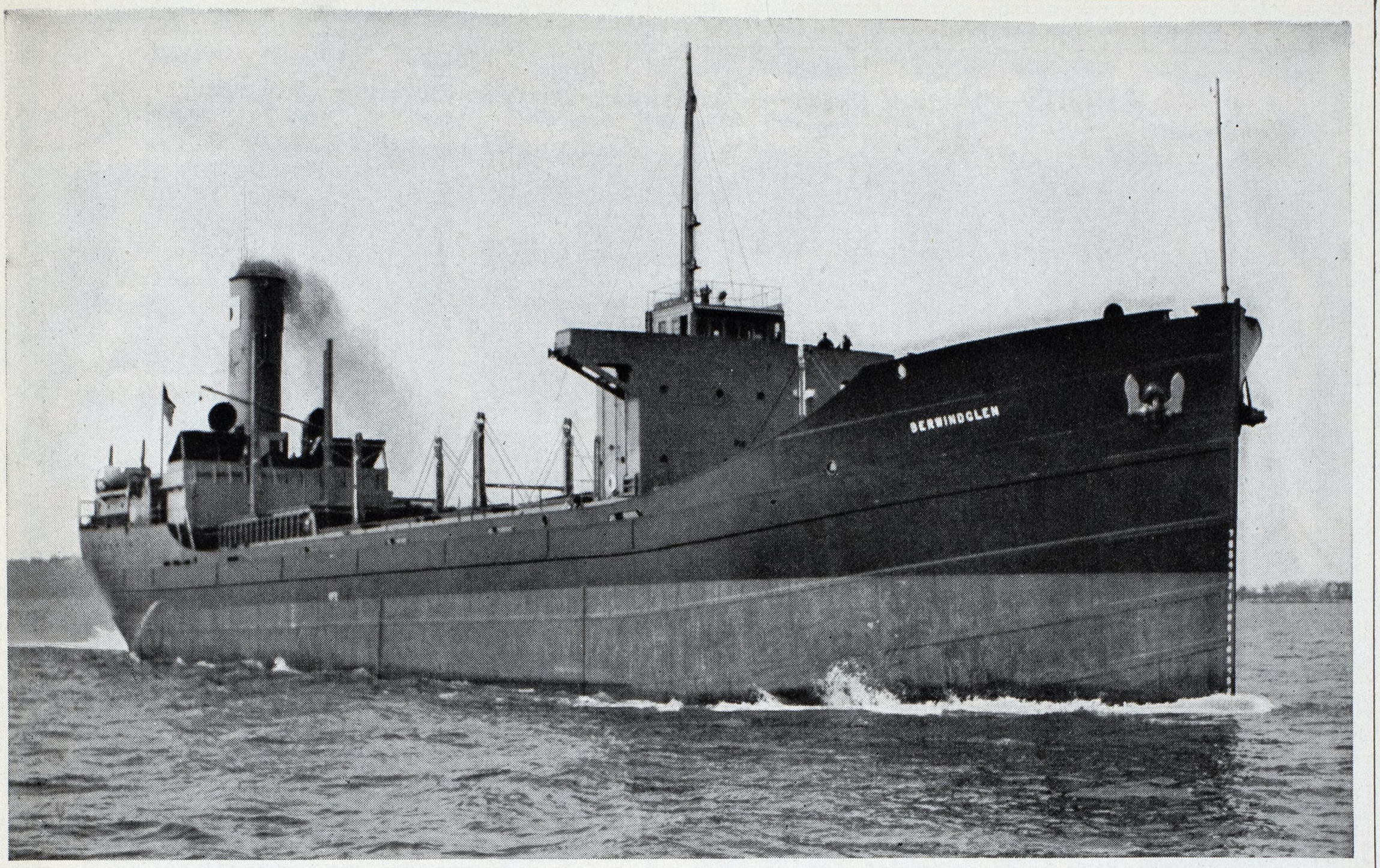
WARREN

Warren Massachusetts

Warren Engineering Corp., 117 Liberty Street, New York City
M. L. Katzenstein, President

Western Engineering Company, 58 Main Street
San Francisco, Cal.

3860



S.S. BERWINDGLEN—S.S. BERWINDVALE

SINGLE-SCREW COLLIERS *built by* FORE RIVER PLANT

for

WILMORE STEAMSHIP CO. — BERWIND WHITE COAL MINING CO.

The FIRST VESSELS constructed in the United States to burn PULVERIZED COAL

PARTICULARS

Length B. P. 350' 0", Breadth Mld. 50' 0", Depth Mld. 30' 3", Draft 23' 9", Speed 10¼ knots

BERWINDGLEN

Deadweight 6610 Tons Two Scotch Boilers
Triple Expansion Engine

BERWINDVALE

Deadweight 6700 Tons Two B. & W. Boilers
Bethlehem Geared Turbines

Both Vessels are fitted with Contra Rudders

BETHLEHEM SHIPBUILDING CORPORATION, LTD. — BETHLEHEM, PA.

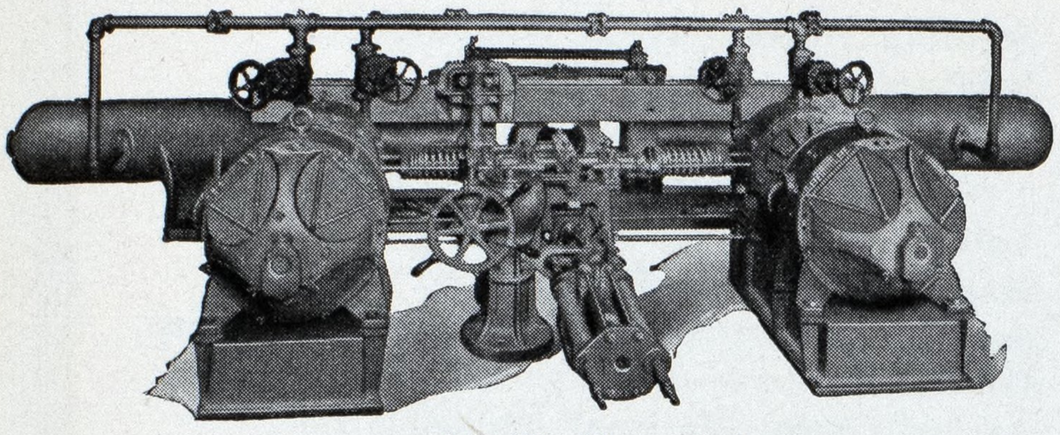
General Sales Offices:

Atlantic Coast: New York: 25 Broadway **Pacific Coast: San Francisco: 20th and Illinois Sts.**
District Offices: Boston, Baltimore and San Pedro

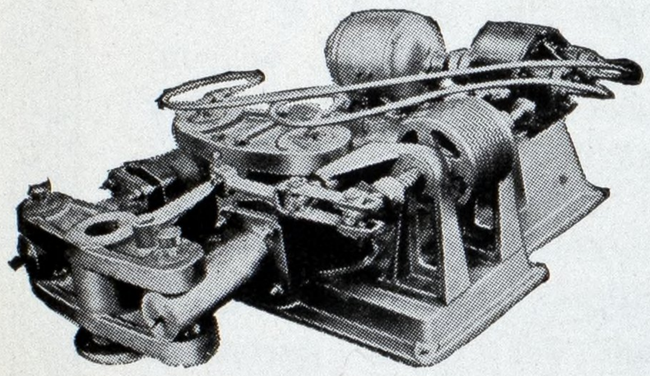
BETHLEHEM

A-E-C-O

AUXILIARIES

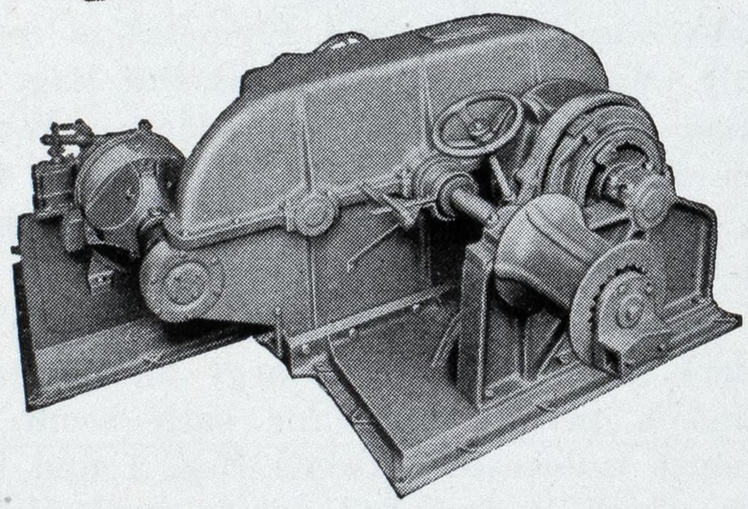


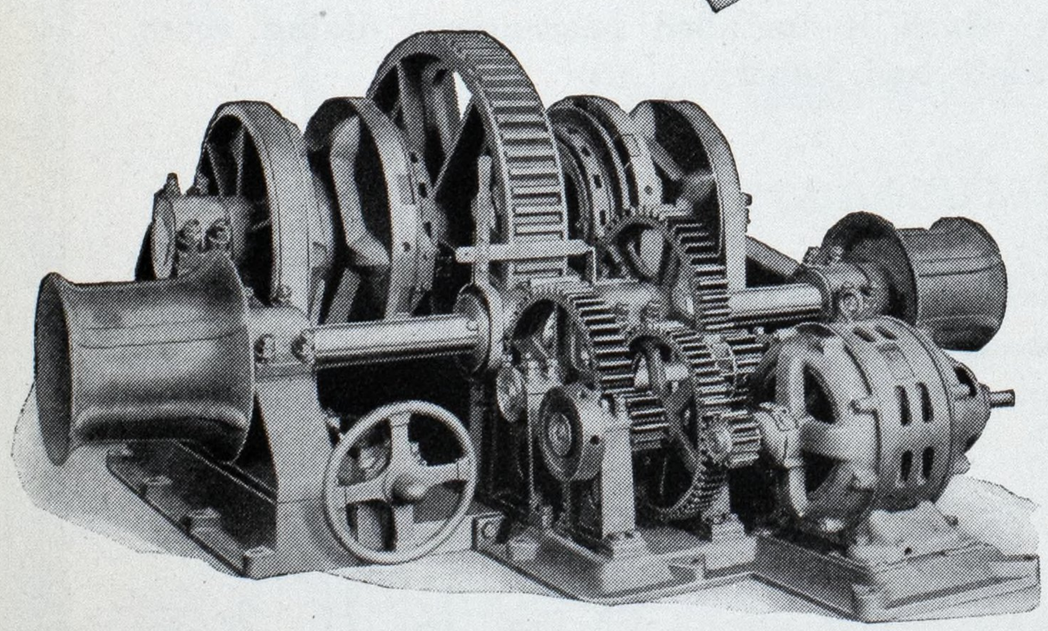
A-E-CO Electro-hydraulic Steerer with complete stand-by drive



A-E-CO Electro-hydraulic steerer for smaller boats

A-E-CO Enclosed Electric Windlass





A-E-CO Spur Gear Electric Windlass

On these new boats—

ARGUS
Steam Steering Gear, Windlass, Capstan

BLUE SUNOCO
Electro-Hydraulic Steerer, Electric Windlass, Capstan

CITY OF HAMPTON
Combined Hand & Electric Steerers

CITY OF NEW YORK
Electro-Hydraulic Steerer, Electric Windlass, Electric Cargo Hoists, Electric Mooring Winches

CITY OF NORFOLK
Electric Steerers and Hand Steering Gears

EMPIRE STATE
Electric Windlasses and Electric Winches

HYDROGRAPHER
Electro-Hydraulic Steerer, Electric Windlass, Electric Capstan, Electric Boat Hoist

ITASCA
Electro-Hydraulic Steerer, Windlass, Capstan

PACIFIC SUN
Differential control only for Sun Steering Gear

SENECA SUN
Electric Steerer and Hand Gear, Windlass, Capstan

TENNESSEE
Electric Steerer, Capstan

TIDEWATER
Electro-Hydraulic Steerer

WARD'S ISLAND
Electric Steering Gears and Hand Gears



A-E-CO Hand Power Capstan

Send for catalogues of A-E-CO Marine Auxiliaries for commercial vessels or pleasure craft.

"Leaders in the Marine field since 1857"

AMERICAN ENGINEERING

AMERICAN ENGINEERING COMPANY, 2437 ARAMINGO AVENUE, PHILADELPHIA

ISHERWOOD
COMBINATION SYSTEM

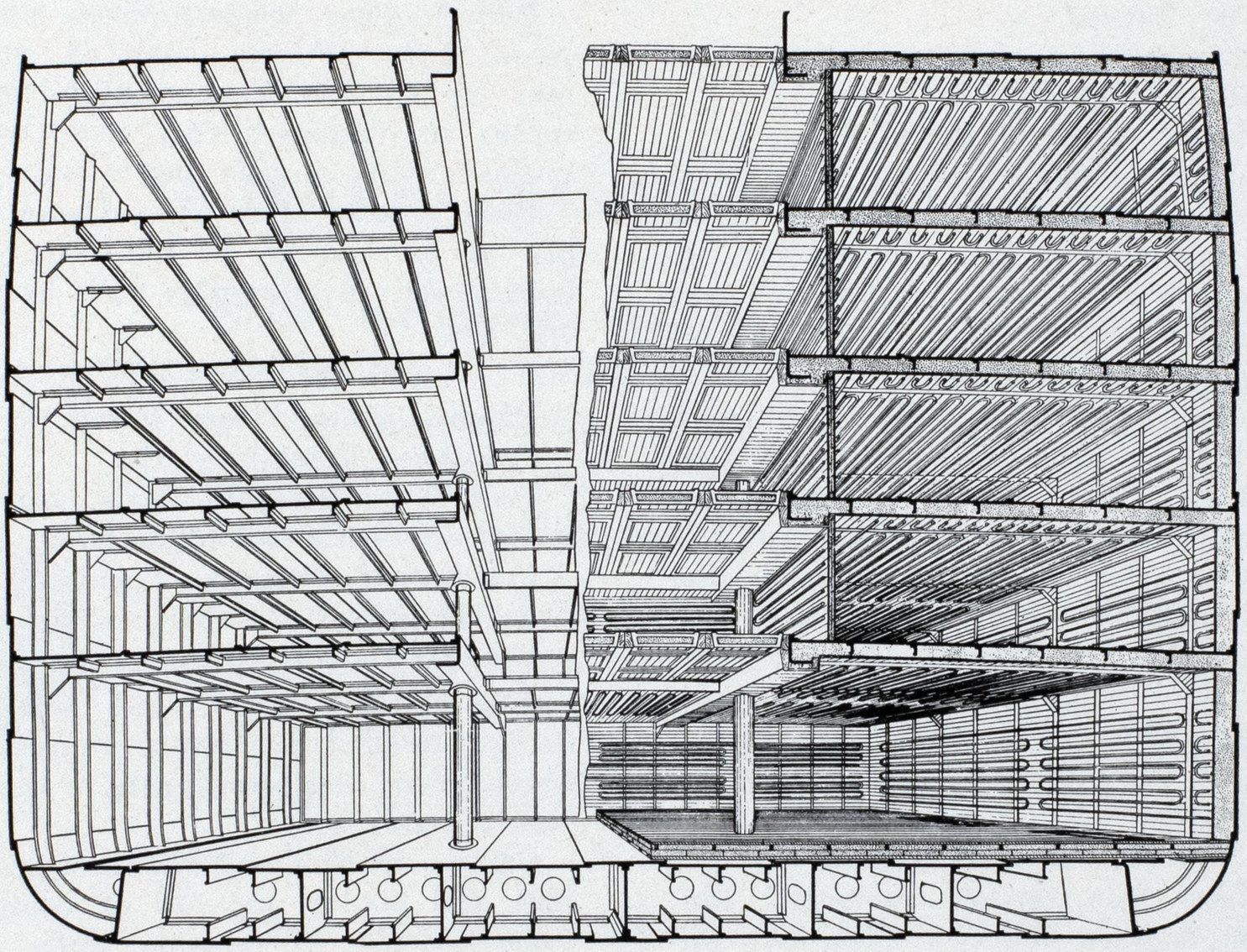
(Incorporating The Miller System Patents now owned by us.)

FOR

PASSENGER LINERS

and

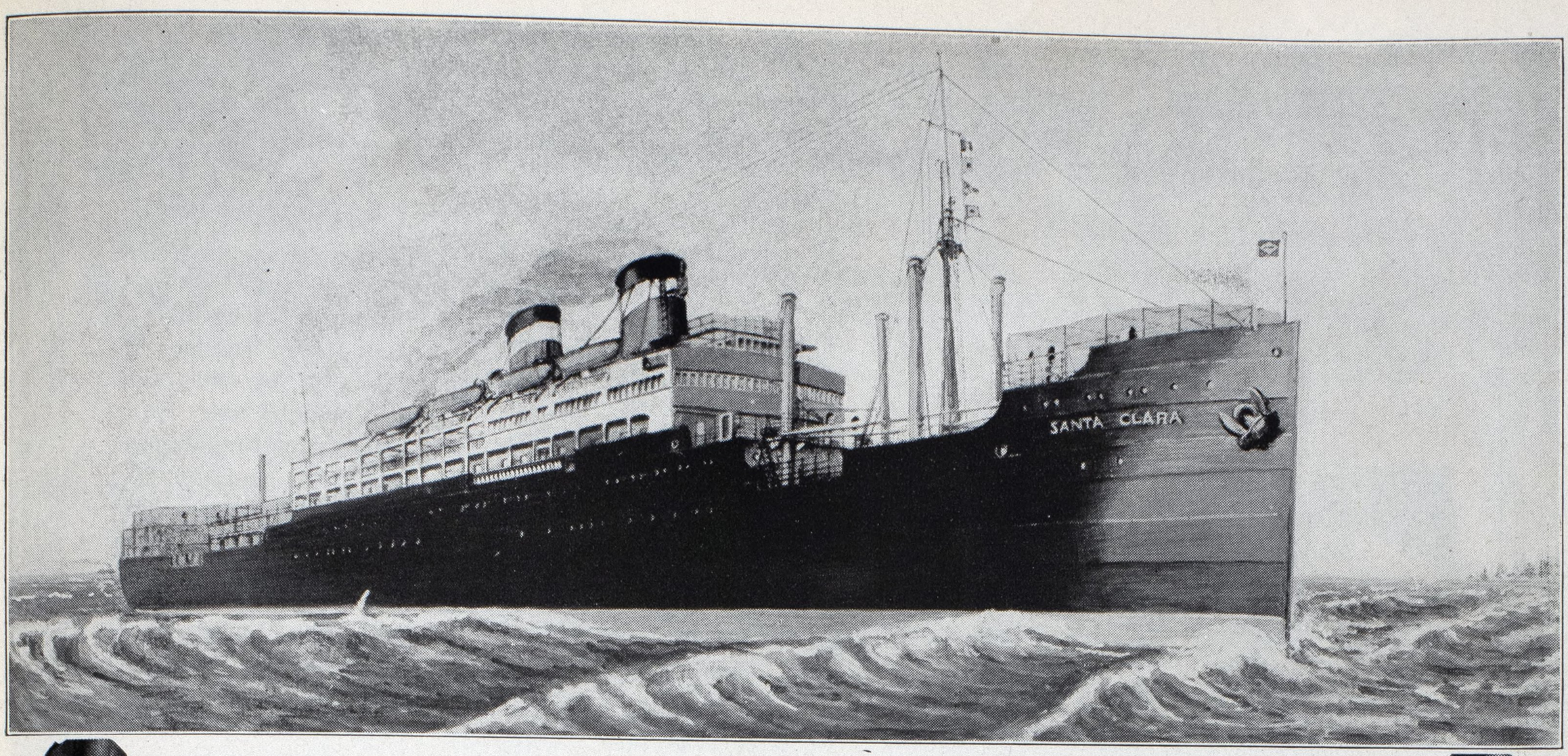
REFRIGERATED VESSELS



The Isherwood Combination System is more economical and advantageous than the ordinary construction and provides for a stronger and more endurable vessel.

SIR JOSEPH W. ISHERWOOD & CO. Ltd.

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"Naco" the modern example of the chain making art and the most reliable of anchor chains was specified for the new Grace liner "Santa Clara", the first passenger ship exclusively for foreign trade to be contracted for under the Merchant Marine Act of 1928.

Naco Anchor Chain provides a factor of safety far in excess of the ordinary anchor chain.

Naco eliminates the usual practice of chipping the wildcat, as Naco links are absolutely uniform in size and shape.

Naco link and stud are one solid piece and cannot become separated.

Write for information about "NACO"

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
General Office—Cleveland, O.

NACO CAST STEEL CHAIN
The Strongest Chain Made
TRADE MARK

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A FEW OF THE DISTINCTIVE SHIPS EQUIPPED WITH BRUNSWICK-KROESCHELL REFRIGERATION

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USS PENSECOLA
USS NORTHAMPTON
USS AUGUSTA
USS CHESTER
USS HOUSTON
USS INDIANAPOLIS
M/V TIDEWATER
S/S BERWINDVALE
S/S BERWINDGLEN
Y HOTOSLAND
Y HI-ESMARO
Y COSAIR
Y JOSEPHINE
Y INTREPID
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Y THE SEVEN SEAS
Y SIALIA
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M/T PACIFIC SUN
S/S MORO CASTLE
S/S ORIENTE
M/S SILVERASH
M/S SILVERBEECH
S/S SAMA
S/S EXCALIBUR
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For more than a third of a century, it has been our privilege, as engineers and manufacturers of refrigerating machinery, to assist in the solution of the many and varied problems of marine refrigeration. Regardless of the size or type of ship, refrigeration presents some problem and as specialists in marine refrigeration, we offer our co-operation with the following facilities:

An ice machine line unparalleled in completeness: *Refrigerating Effect* . . . as large as 500 tons and as small as 1/20 ton in individual units. *Refrigerants* . . . Ammonia—Carbon Dioxide—Methyl Chloride.

An engineering personnel with wide experience in all branches of applied refrigeration and keenly appreciative of the need for giving equal consideration to the economic as well as the technical features of any refrigerating problem.

A full-visioned management, each member of which is at the same time an individual specialist in some one of the vital divisions of our business—finance—sales—manufacturing—engineering—research. This type of management offers maximum opportunity for wise, skilled and prompt action to the mutual benefit of our customers and ourselves.

BRUNSWICK-KROESCHELL COMPANY

ENGINEERS AND MANUFACTURERS

Refrigerating and Ice Making Machinery

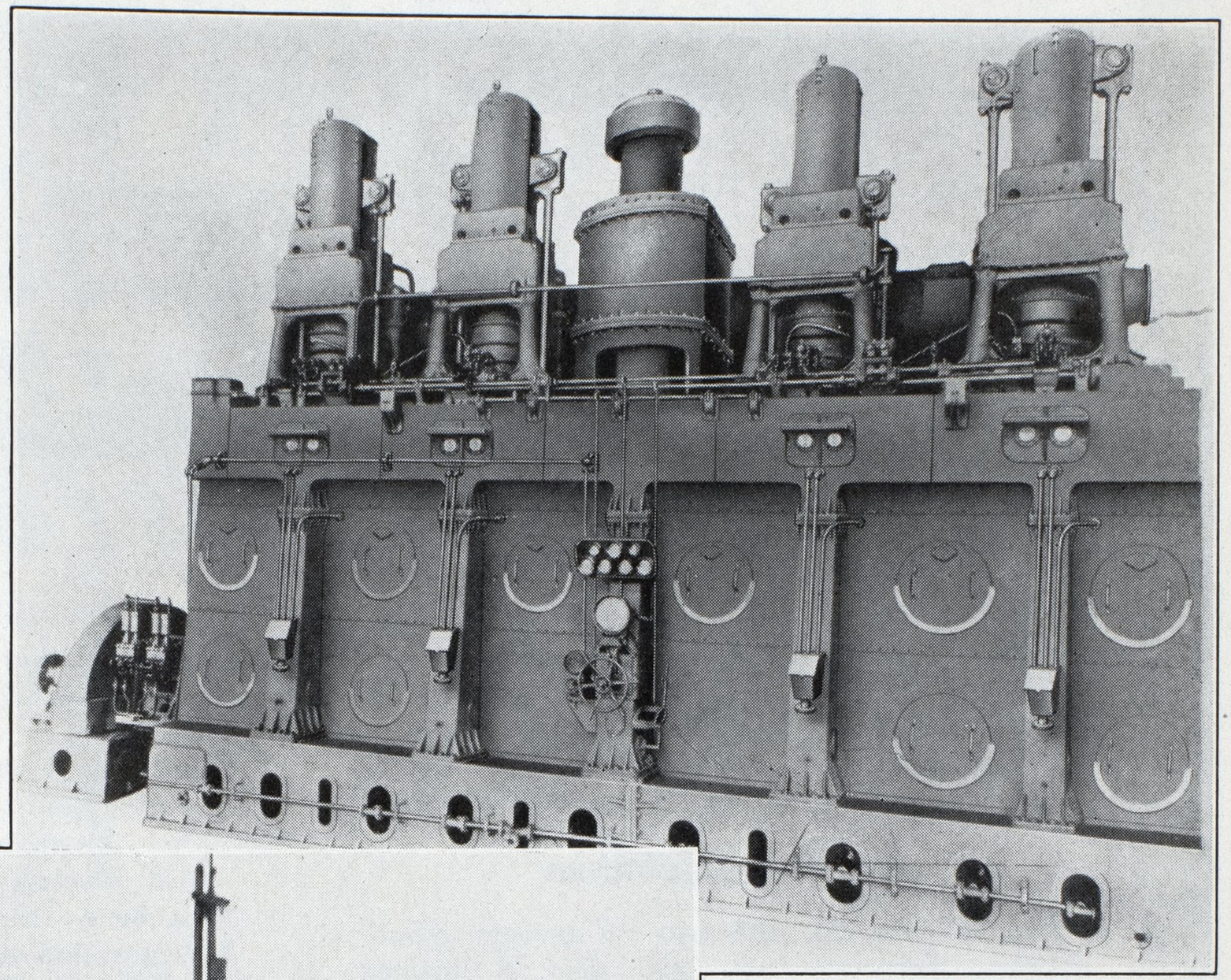
NEW BRUNSWICK, N. J. - - - CHICAGO, ILL.

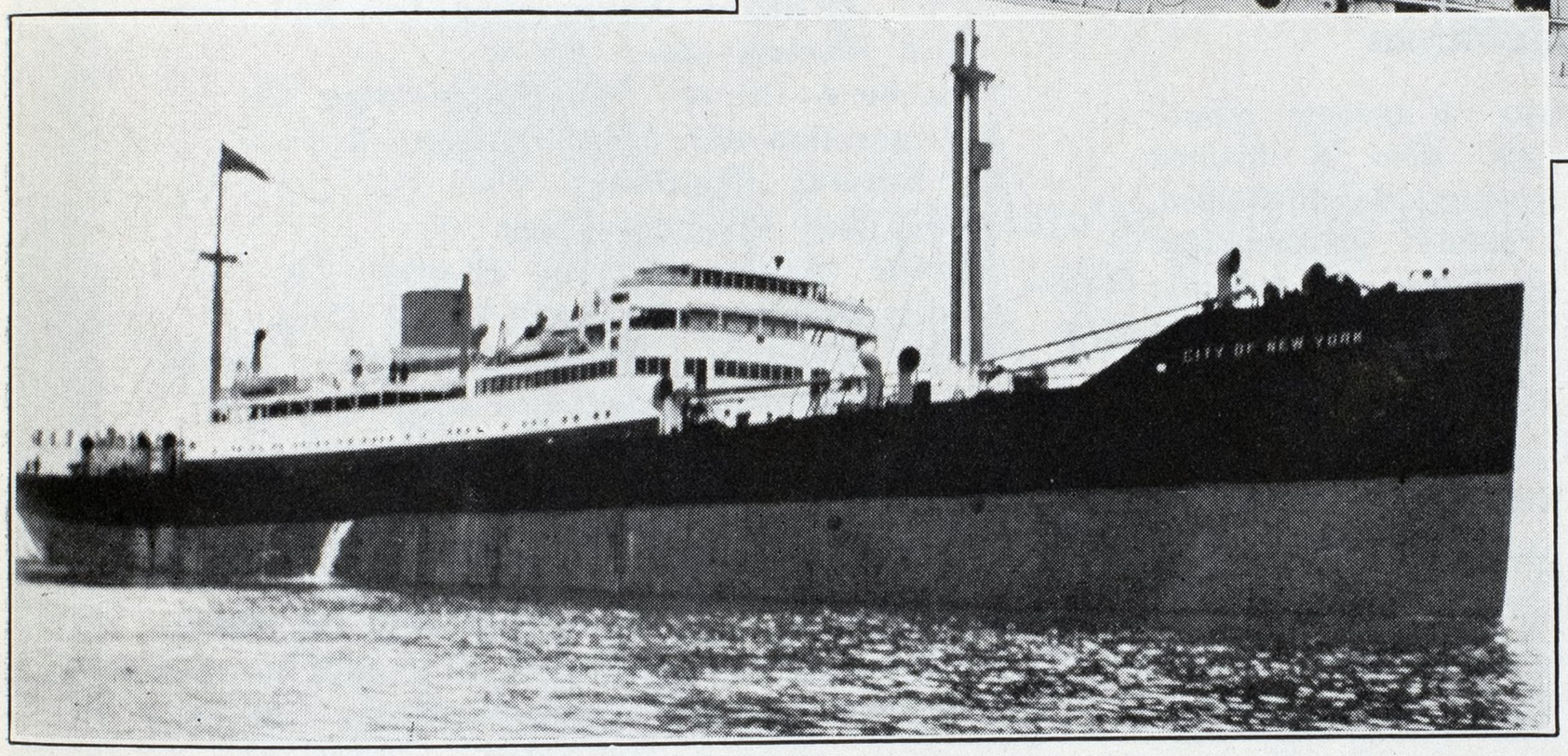
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"THE STANDARD FOR ALL MARINE INSTALLATIONS"

Power with Efficiency

SUN-DOXFORD Opposed-Piston DIESEL ENGINES





The Ms. City of New York, first big combination freight and passenger motorship built in America, is owned by the American South African Line. Her length is 470 ft. 8 in., deadweight capacity 9350 tons, first class passenger accommodation 60, power 5400 s.h.p. and speed 14 knots

Builders of

Passenger and Cargo Vessels—Oil Tankers

Unlimited facilities for

MARINE REPAIRS

Two floating Dry Docks

11,000 Tons Lifting Capacity Each

DRYDOCKING AND REPAIRS

BUILDERS OF ALL TYPES OF VESSELS

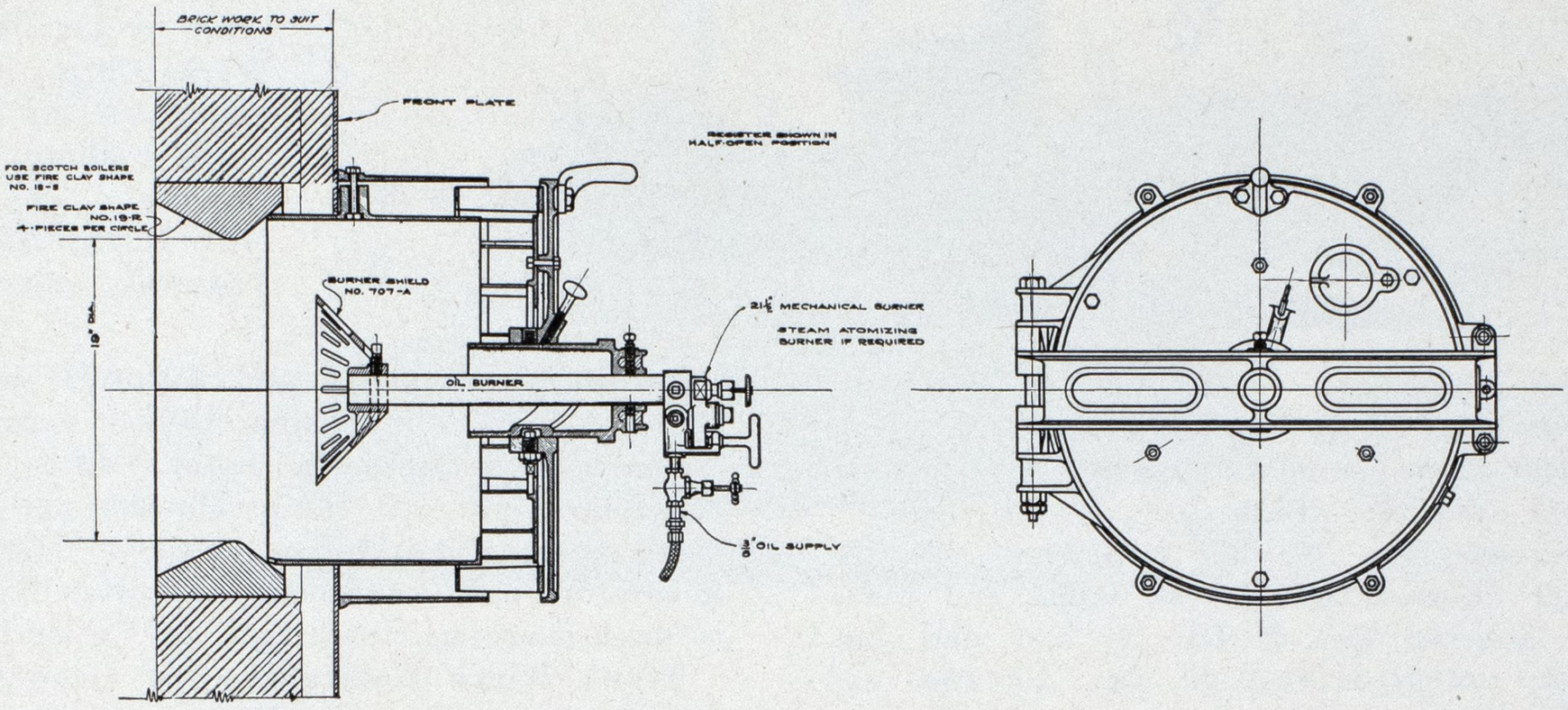
SUN SHIPBUILDING & DRY DOCK COMPANY

Shipyard & Main Office
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25 Broadway
NEW YORK

COEN Combustion Engineers

TYPICAL COEN BURNER INSTALLATION



COEN MECHANICAL OIL BURNER
AND
TYPE LR NATURAL DRAFT AIR REGISTER

COEN BURNERS ON HONOR ROLL

The Honor Roll for U. S. Shipping Board vessels six months' period, Jan. 1st, 1929, to June 30th, 1929, recently released by the U. S. S. B., Fuel Conservation Section, involved the analysis of performances of 249 vessels.

50 were placed on the *Honor Roll*, of which

42 were oil burning steamers.

26 of the 42, or *62%* were equipped with COEN BURNERS.

Of the 47 vessels given *Honorable Mention*,

42 were oil burning steamers.

27 of the 42, or *64.3%* were equipped with COEN BURNERS.

There were *7* makes oil burners represented on the Honor Roll, and 6 makes on the Honorable Mention list.

COEN COMPANY, INC.

LOS ANGELES
428 Story Bldg.

SAN FRANCISCO
112 Market St.

HOUSTON
Post Dispatch Bldg.

NEW YORK
50 Church St.



BEAM TRAWLERS

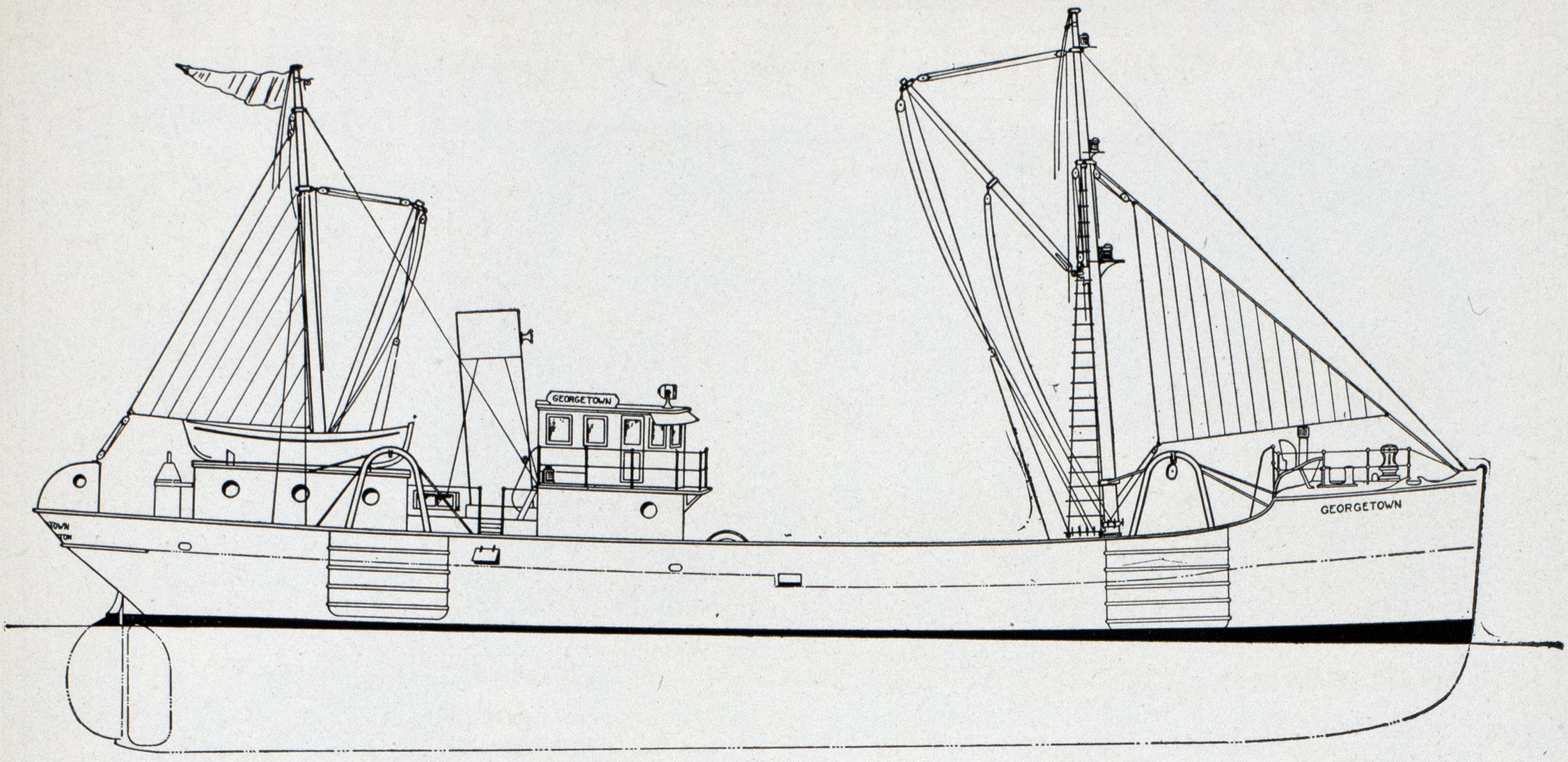
WINTON-POWERED

THE fleet of the Bay State Fishing Company, Boston, Mass., was increased recently by the addition of two new modern single-screw steel Diesel-powered beam trawlers, the *Ebb* and *Flow*, designed and built by the Bath Iron Works, Bath, Me. Length overall, 132 feet, 4 inches; beam 24 feet; draft, 13 feet. All electrical equipment furnished by the General Electric Company. All trawling gear, including winch and deck fittings, gallows frames and bollards, furnished by the New England Trawler Equipment Company. Built and powered for increased production, greater economy, lower upkeep, fewer tie-ups, and longer life—the main engine in each vessel is a six-cylinder, 14½" x 21", 500 b.hp., mechanical injection Winton-Diesel.

The *Ebb* and *Flow* fit perfectly into the Bay State Fishing Company's machinery for delivering fresh marine delicacies to the dining tables of the nation. Like the entire plant of the "Forty Fathom Fish" producers, these two vessels represent the peak of long-continued efforts to modernize the fishing industry. The trawl winch, instead of being driven by the main engine thru mechanical transmission, is driven electrically by a separate power plant consisting of an 80 k.w. Winton-Diesel Generator Set and a 100 hp. General Electric marine motor. The most economical, flexible, and easiest-controlled method of winch drive, insuring a greatly increased flow of smooth power instantly available for starting.

The Winton Engine Company

Cleveland, Ohio, U. S. A.

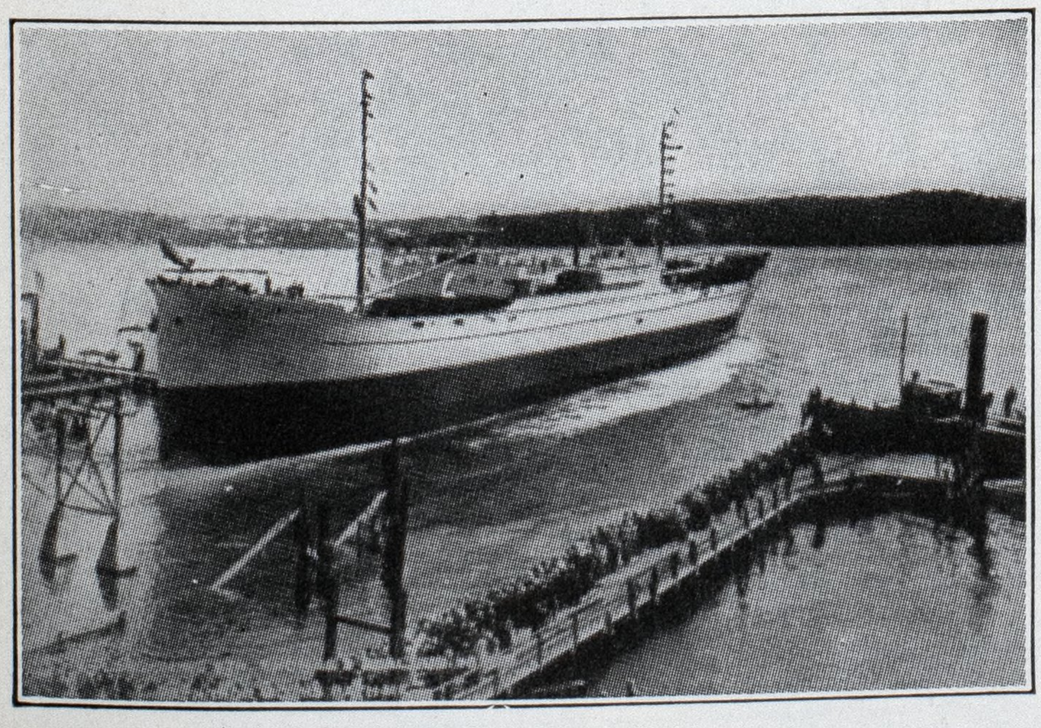


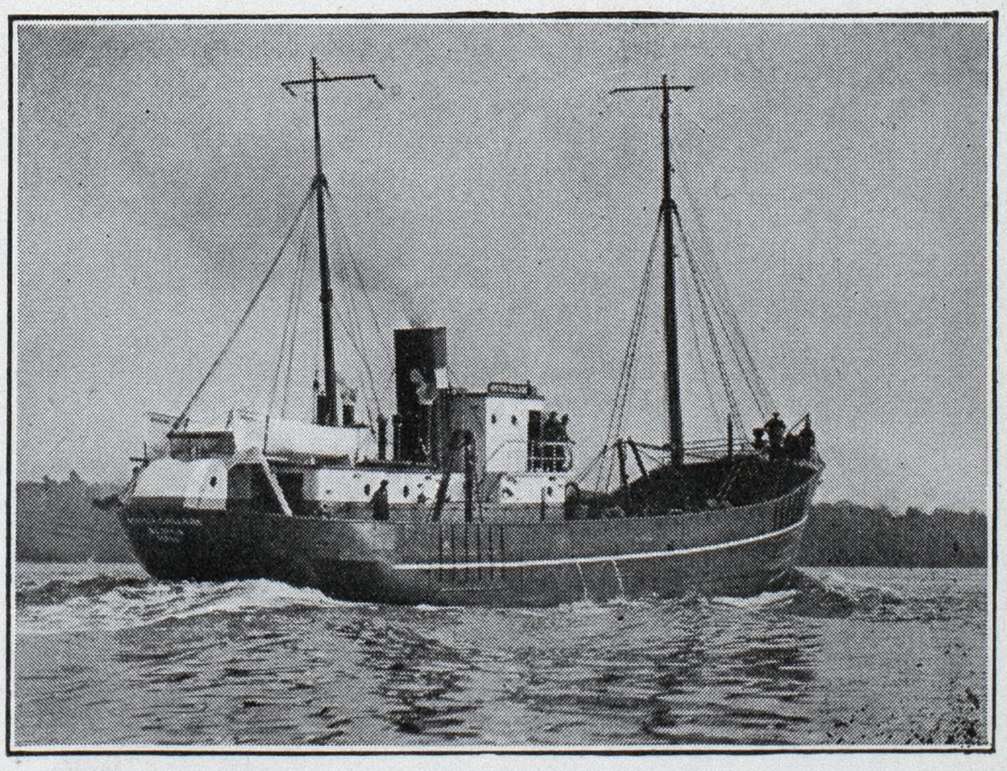
BATH IRON WORKS CORPN.

Shipbuilders and Engineers

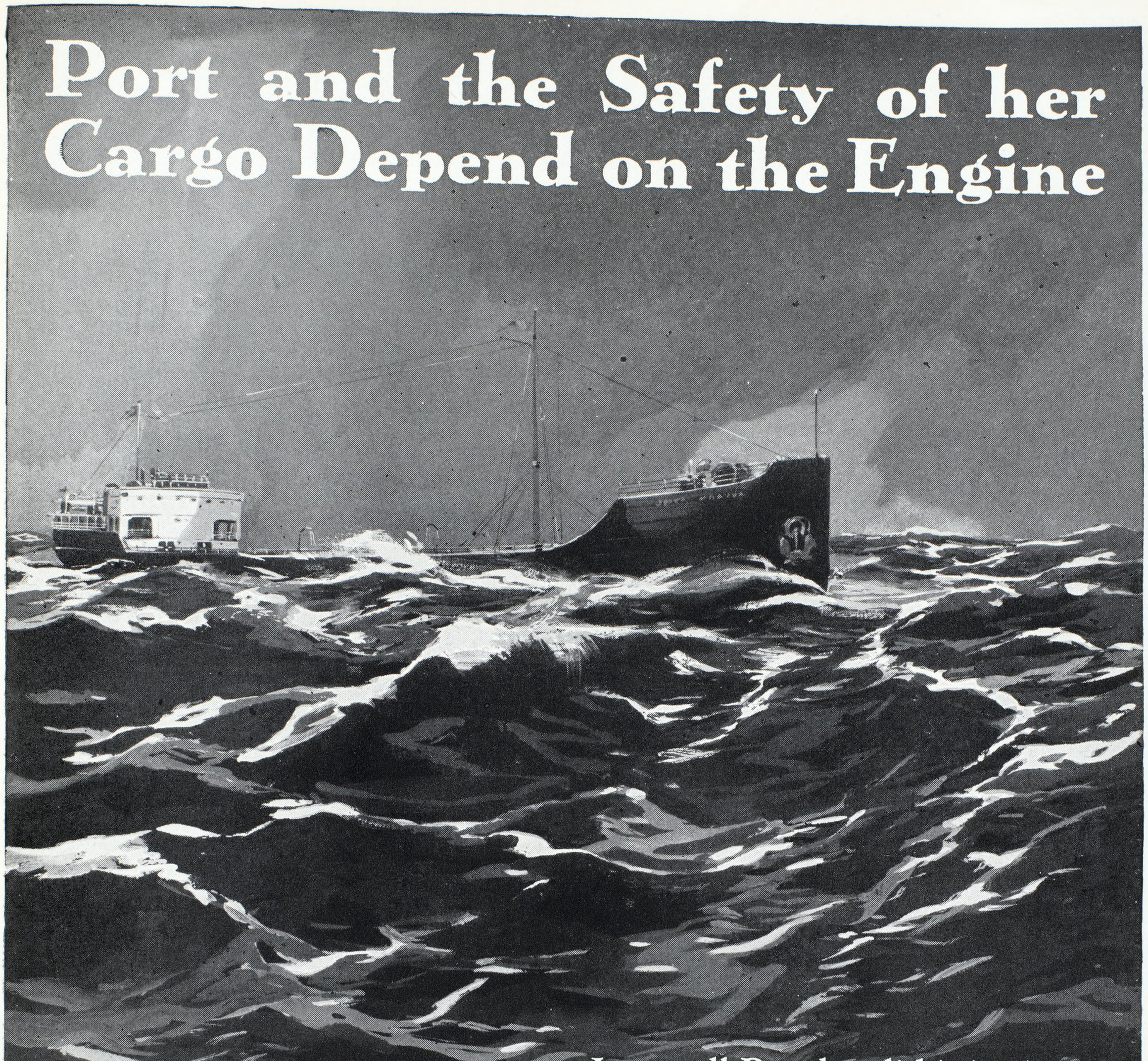
Bath, Maine, U. S. A.

Vessels of all types up to 450′ length





Port and the Safety of her Cargo Depend on the Engine



Ingersoll-Rand solid-injection Diesel Engines are built by marine men for marine work.

Their dependability is best attested by the success with which they have met under actual service conditions.

INGERSOLL-RAND COMPANY, - 11 Broadway, - New York City

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THE

LEATHEM D. SMITH SYSTEM FOR NEW OR CONVERTED SELF-UNLOADING SHIPS

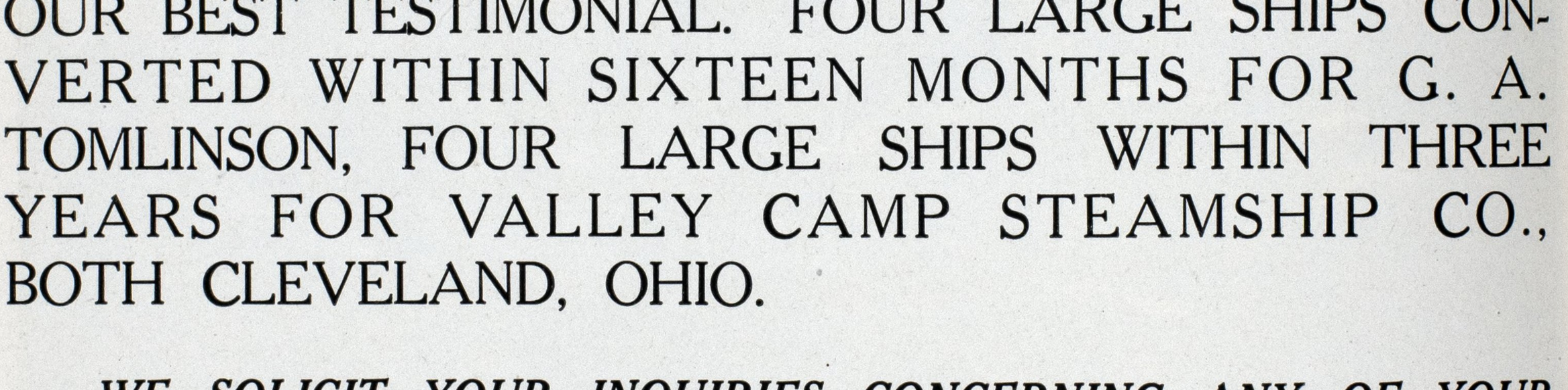
— AND —

BULK STORAGE RECLAMATION

THRU SPECIALLY PATENTED DEVICES OF LEATHEM D. SMITH IT IS MADE POSSIBLE TO RECONVERT STANDARD LAKE AND SEA GOING BULK FREIGHTERS INTO SELF-UNLOADERS TO HANDLE ALL CLASSES OF BULK MATERIAL SUCH AS COAL, STONE, PUMPED SAND ORE, GYPSUM, BULK CEMENT, SALT, A LARGER RANGE OF MATERIAL THAN HANDLED BY ANY OTHER SYSTEM. WE NOW HAVE TWENTY-ONE BOATS IN OPERATION WITH THIS DEVICE, RANGING FROM 2,000 TO 10,000 TONS. WE ALSO SPECIALIZE IN THE DESIGNING OF SELF-UNLOADING RIVER BOATS.

REPEAT ORDERS FROM SATISFIED CUSTOMERS OUR BEST TESTIMONIAL. FOUR LARGE SHIPS CONVERTED WITHIN SIXTEEN MONTHS FOR G. A. TOMLINSON, FOUR LARGE SHIPS WITHIN THREE YEARS FOR VALLEY CAMP STEAMSHIP CO., BOTH CLEVELAND, OHIO.

WE SOLICIT YOUR INQUIRIES CONCERNING ANY OF YOUR WATER TRANSPORTATION AND ALSO DOCK STORAGE AND RECLAMATION PROBLEMS.

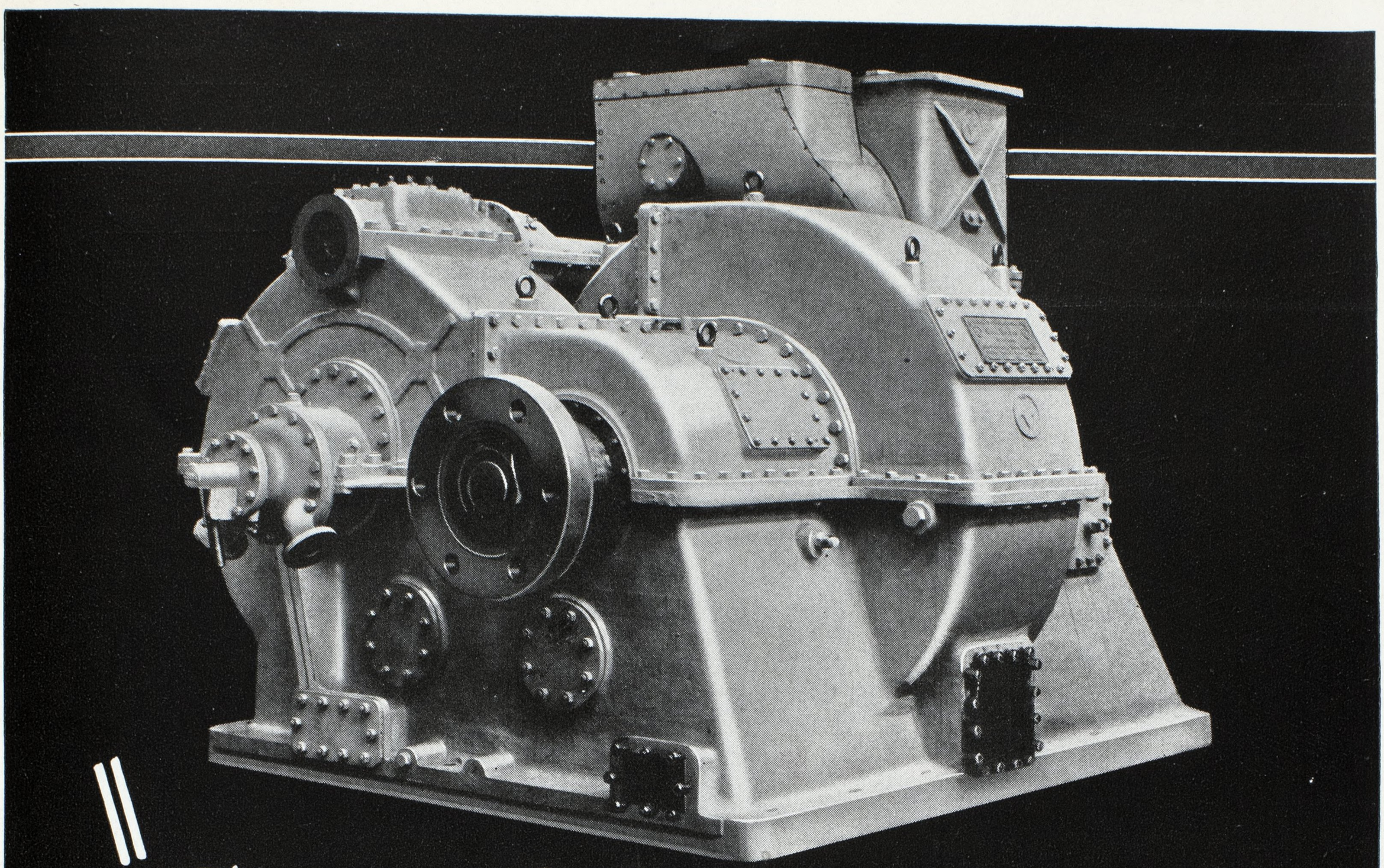


Three converted ships with our system awaiting cargo at loading dock

LEATHEM D. SMITH DOCK CO.

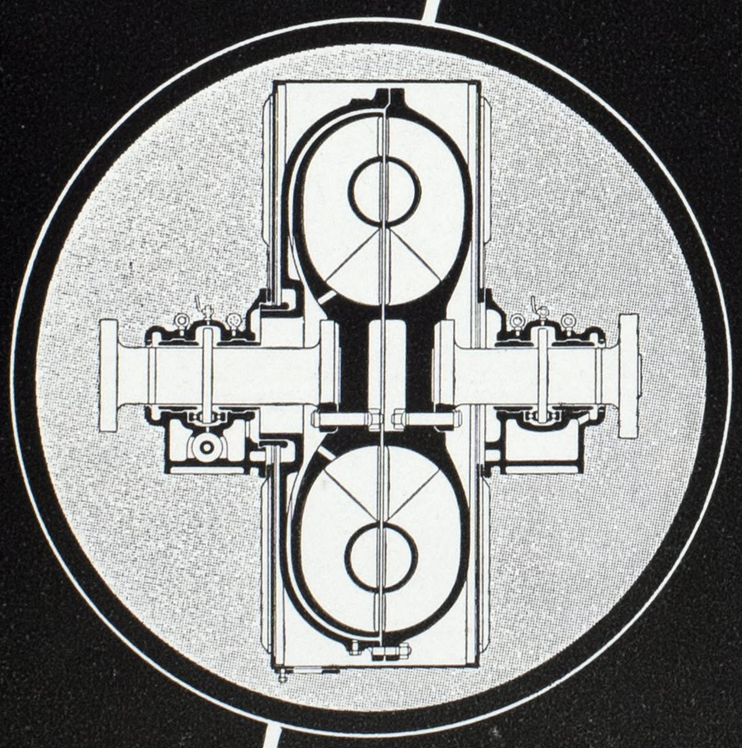
PLANT LOCATION
STURGEON BAY, WIS.

ENGINEERING OFFICE: 205 W. WACKER DRIVE
1407 ENGINEERING BLDG., CHICAGO, ILL.



Speed Increased *from* A Maximum of 11.6 to 13.6 Knots

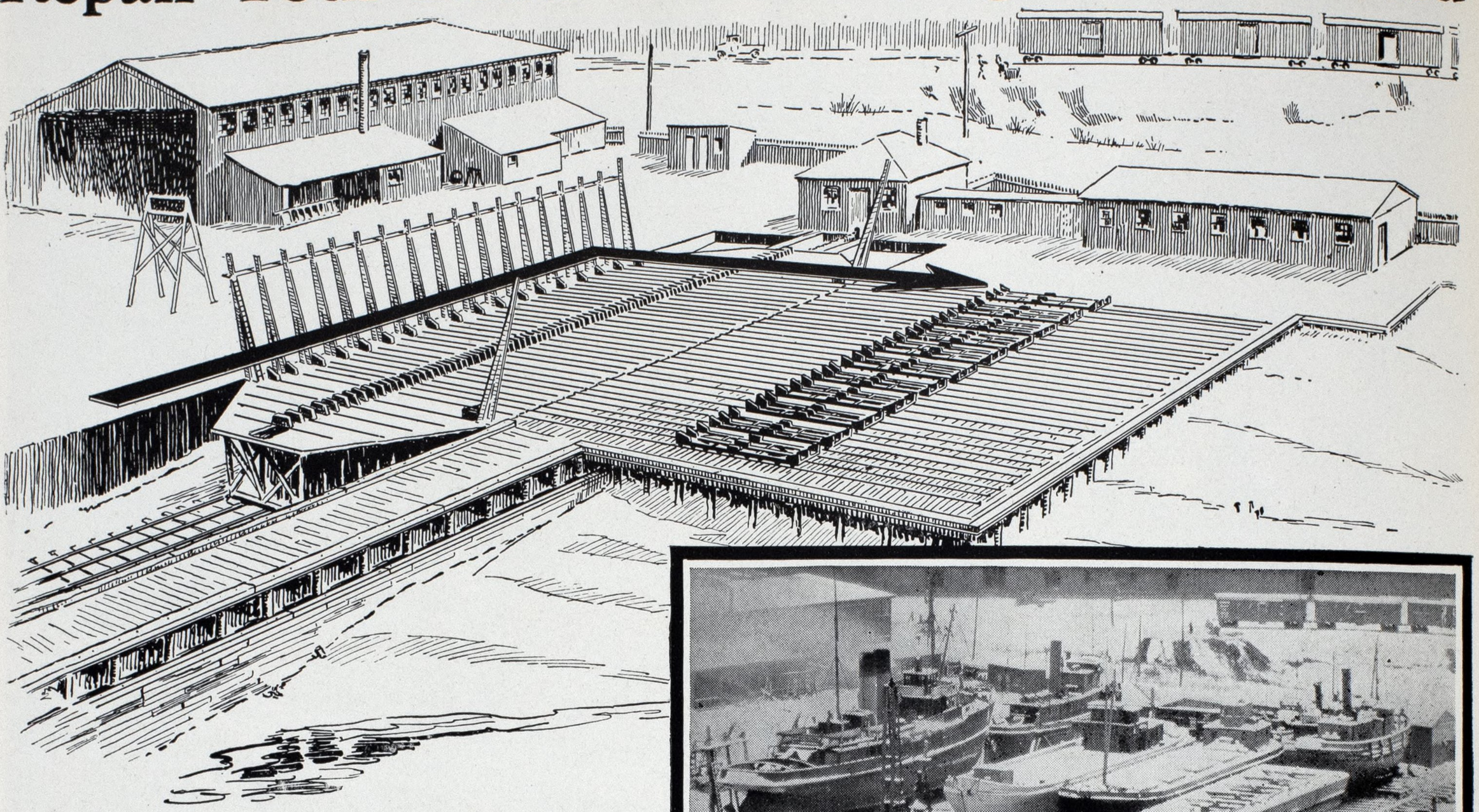
is the report from the trial of the S. S. "*Lena Luckenbach,*" in which the Bauer-Wach System was recently installed to supplement a triple expansion engine using steam at 200 lbs. from Scotch boilers. The increased speed is obtained without driving the boilers any harder.

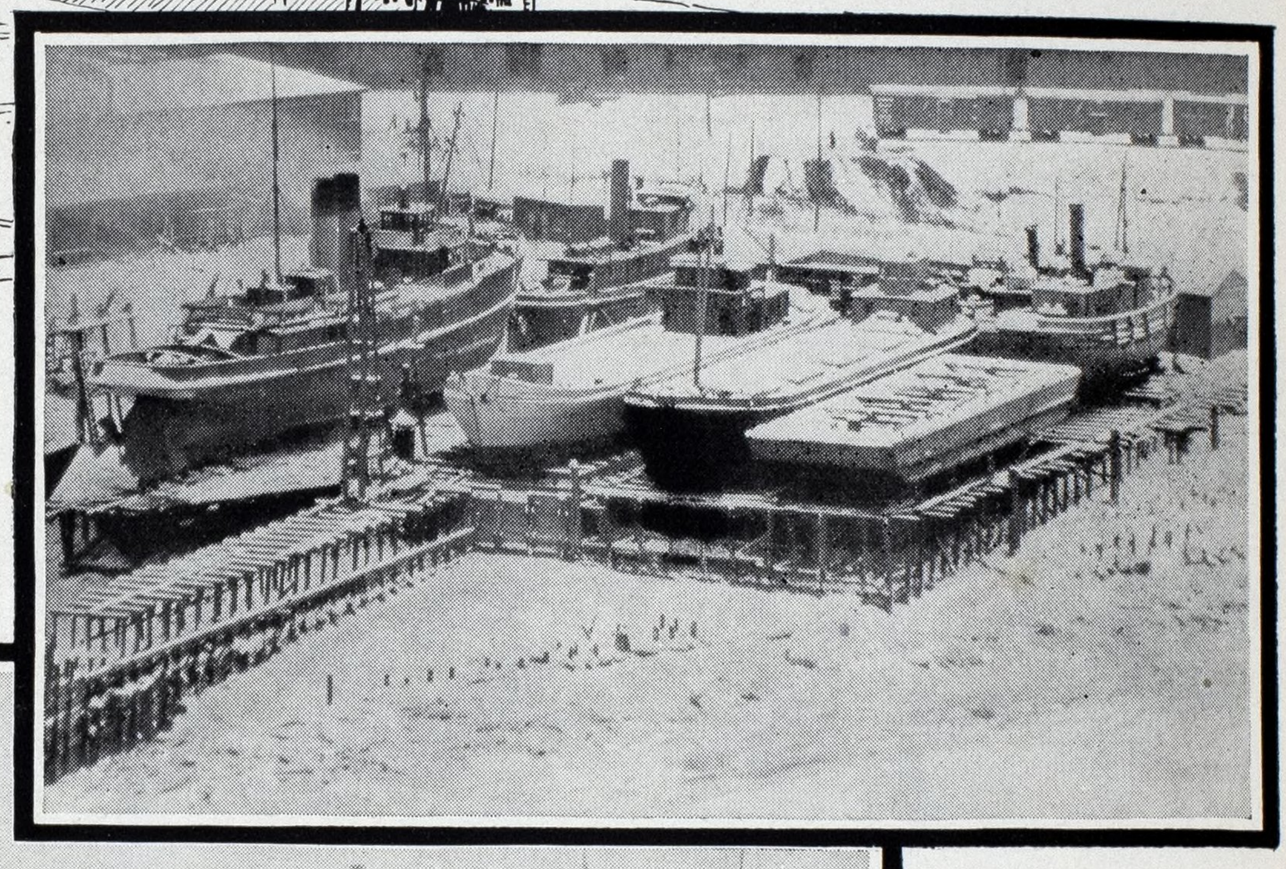


In the *De Laval Bauer-Wach System,* a hydraulic clutch protects the exhaust turbine from the shocks of the piston engine and, also, disconnects the turbine when the engine is reversed. The vessel can be propelled by the turbine alone.

American Licensees **De Laval Steam Turbine Company**
Trenton, New Jersey

Repair Your Boats While Navigation is Closed



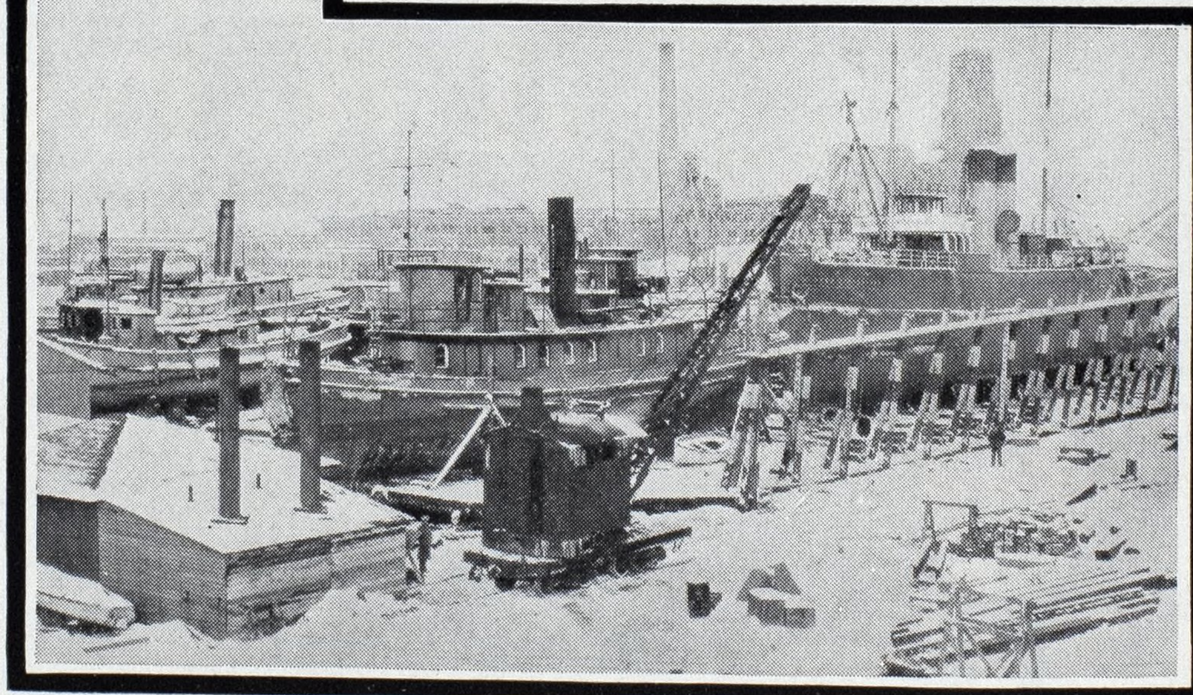


— then no time is lost when navigation is open

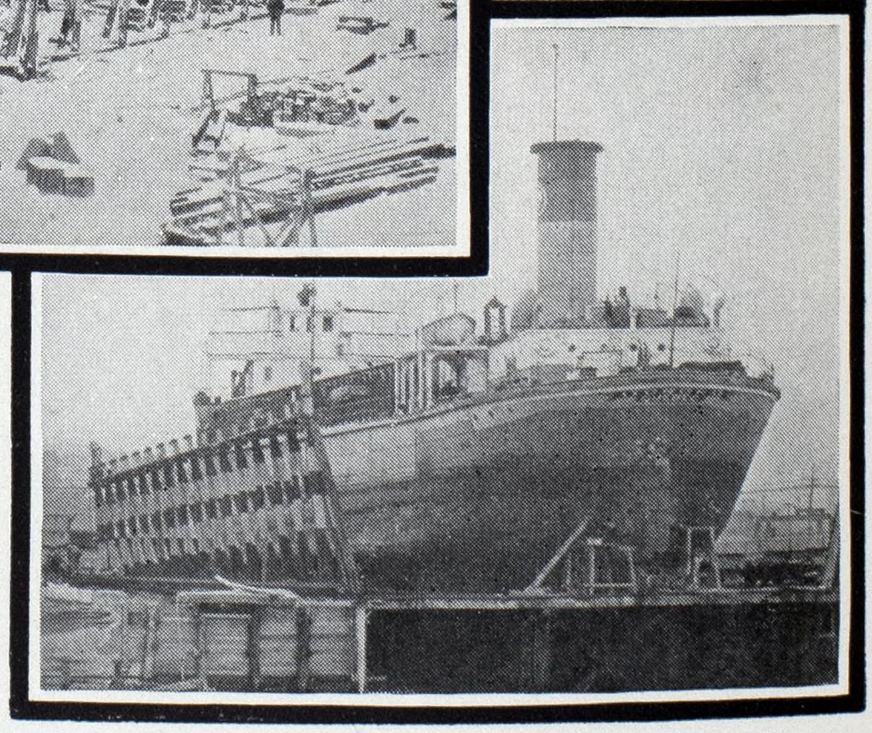
BY MEANS of a Crandall Railway Dry Dock and Transfer System, the Morton Engineering & Dry Dock Co., Ltd., of Quebec, Canada, stored nine vessels in dry dock for repair work during this past winter.

By such dry storage during the winter, the owner is assured of the safety of his boat from the danger of ice damage. The desirability of having necessary repairs and painting completed by the opening of navigation is quite obvious—and the repair yard is assured of good business through the winter months.

We shall be glad to send you information and prices in regard to a Crandall Railway Dry Dock and Transfer System for your plant.

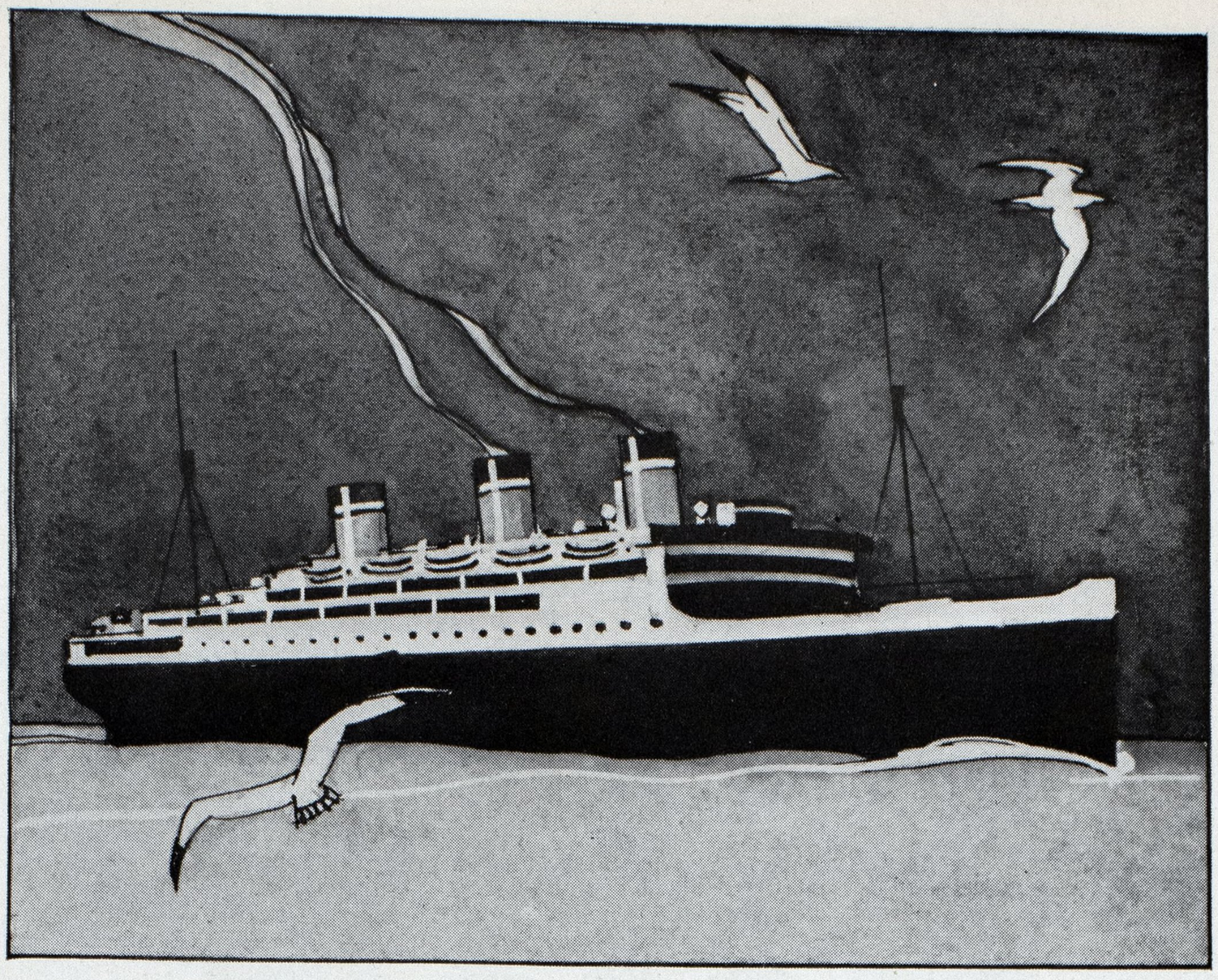


Showing the Crandall Railway Dry Dock and Transfer System in use at the Morton Engineering & Dry Dock Co. Ltd., at Quebec, Canada.



THE CRANDALL ENGINEERING CO.

Cambridge, Massachusetts



Getting Longer Life from Condenser Tubes is Part of Scovill Service

THE aim of every engineer is to get more life from condenser tubes. That is also the aim of Scovill service. And because the experience of one man is necessarily limited while the experience of *all* Scovill engineers is available to each it is natural to suppose that Scovill service is valuable.

It has proved so in hundreds of installations. In many cases slight changes have solved difficulties and resulted in increased condenser tube life. Consultation, suggestion, installation and service are backed by the experience gained in the inspection of countless installations, both marine and stationary, in this country and abroad.

This Scovill service is available to all marine engineers. It is a service of quality—an indicator of the quality of Scovill condenser tubes. Before you install new tubes let a Scovill engineer go over the problem with you.

SCOVILL

Established 1802

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Atlanta
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Providence
Cleveland
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San Francisco

Cincinnati
Philadelphia
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MARINE Forgings for many years have been an important part of our business and our geographical location is such that all customers are assured of the fastest possible forging service.

ERIE FORGINGS

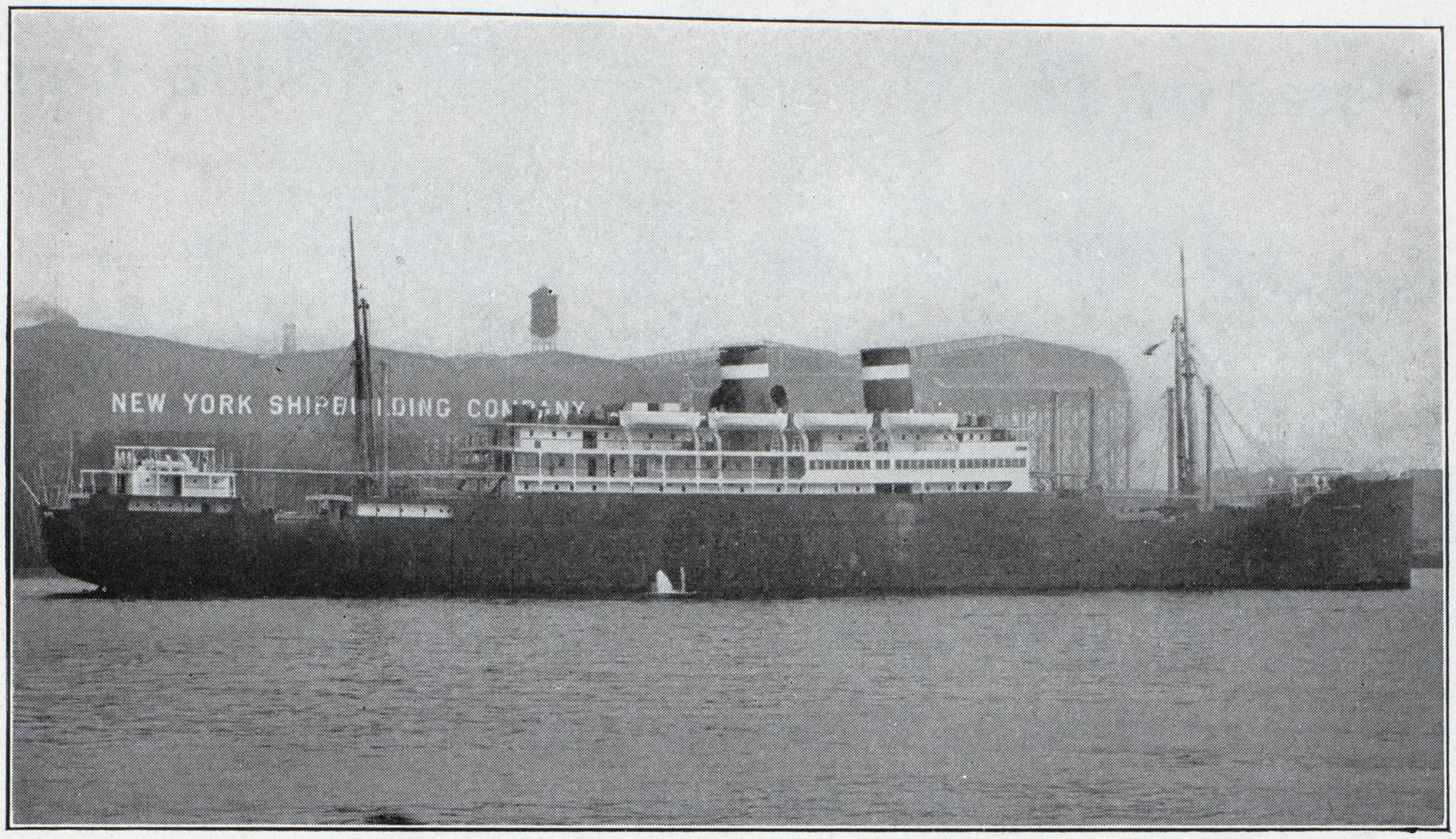
Specialists in Diesel Engine Crankshafts

We also operate a high grade steel foundry department in which we are prepared to make castings up to 150,000 lbs. each.

Erie Forge Company
Erie, Penna.

S.S. SANTA CLARA

Designed and delivered within 15 months from date of contract



BUILT BY

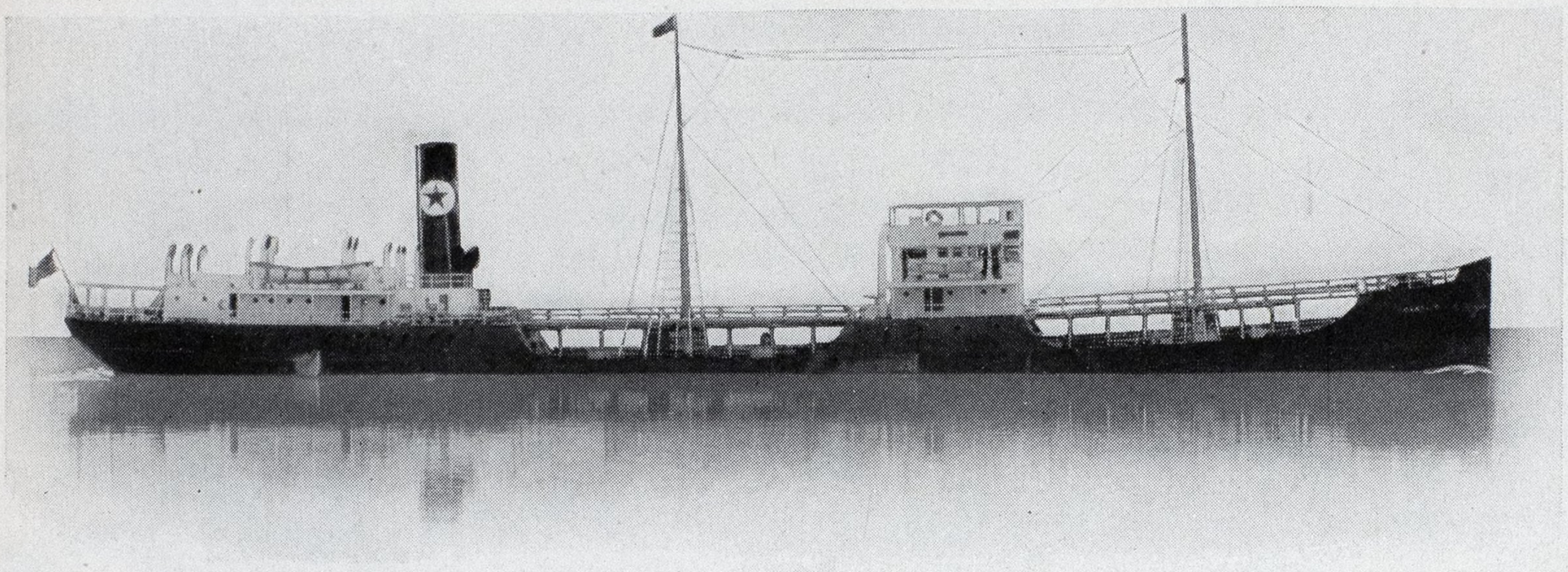
NEW YORK SHIPBUILDING COMPANY

Main Office and Works: Camden, New Jersey

New York Office: 420 Lexington Avenue

Built by United—
Means Built-in Quality

Based on Thirty Years of Ship Construction



At the left is the tanker Franklin, 4,500 dead-weight tons, built at United's Staten Island plant. She is 299.3 feet long, has a breadth of 43.1 feet and is 25.6 feet deep.



To the right, the S. S. Dixiano, another tanker built at the Staten Island plant. Of 6,300 dead-weight tons, she is 360 feet long, has a breadth of 50.2 feet and depth of 29.2 feet.

IN THE thirty years since United's Staten Island plant became the pioneer builder of steel ships in New York Harbor, more than 800 hulls have been sent down its ways. Each of them has attested the skill and quality of United's craftsmen.

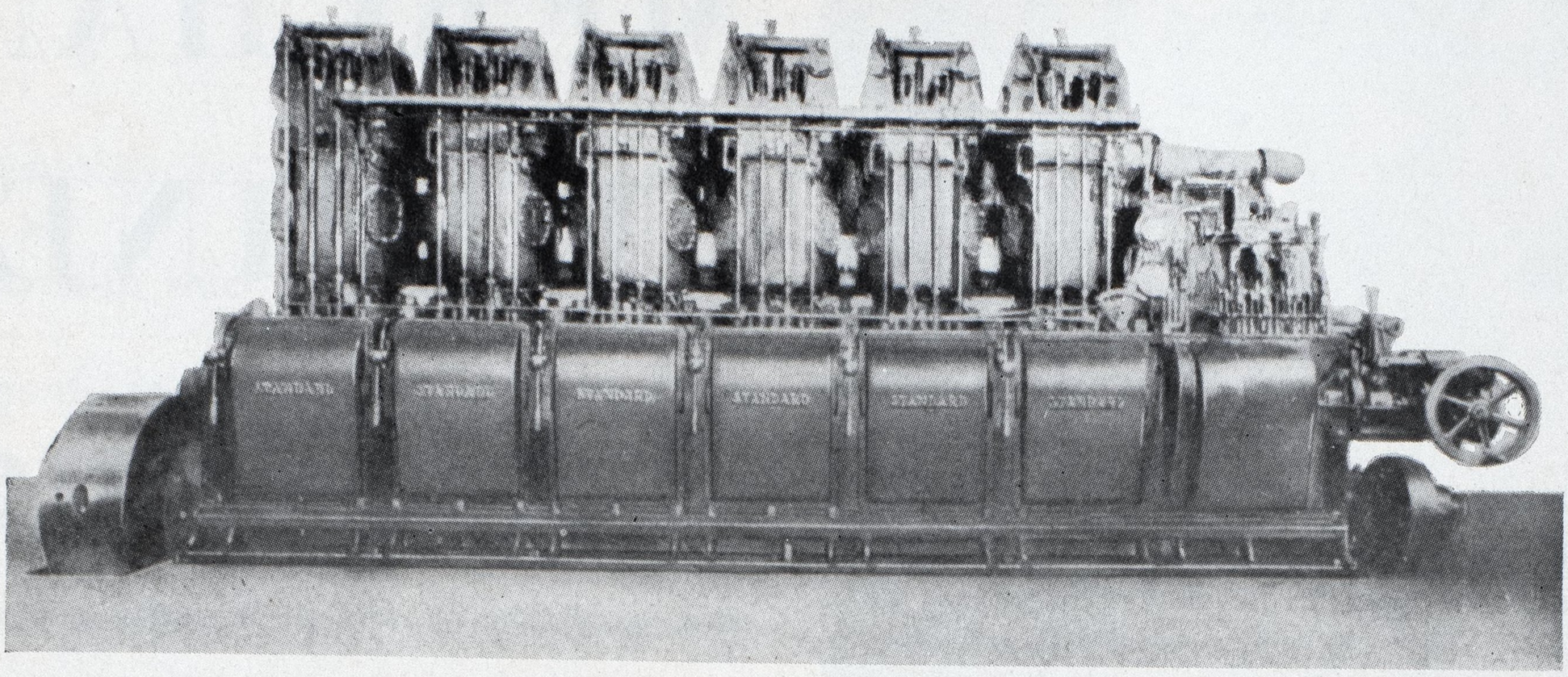
With its four shipways, United builds vessels of every class—steamships and all kinds of harbor craft. United possesses the great advantage of being able to manufacture in its own departments almost everything that goes into the building of a ship. This means a saving of time and money to clients, and is a further guarantee of a job well done.

Five plants *27 Drydocks* *Four Shipways*

UNITED DRY DOCKS, INC.

11 Broadway DIGby 0500 New York

DIESEL DEPENDABILITY

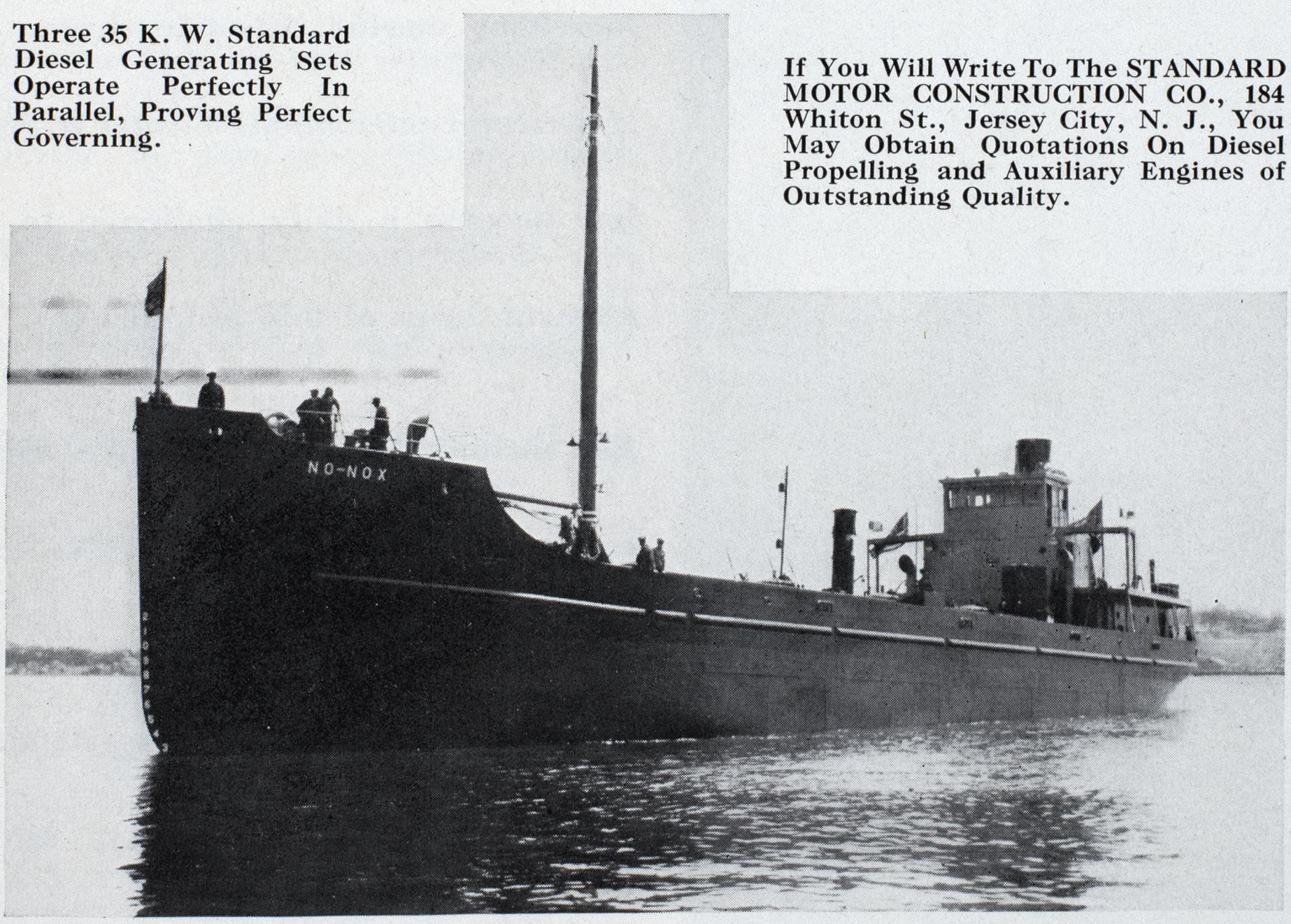


Two of these 330 H. P. Direct Reversible Diesels
Drive the Gulf Refining Co. Tanker "No-Nox" 9½ Knots.

Nothing Could Be More Reliable Than These Engines In The "No-Nox"....

Three 35 K. W. Standard Diesel Generating Sets Operate Perfectly In Parallel, Proving Perfect Governing.

If You Will Write To The STANDARD MOTOR CONSTRUCTION CO., 184 Whiton St., Jersey City, N. J., You May Obtain Quotations On Diesel Propelling and Auxiliary Engines of Outstanding Quality.



STANDARD DIESELS



OUR NEWER MERCHANT MARINE—

A Challenge!

UPON the high seas, along our inland waterways, in and about our harbors, you'll find electrified ships—leaders of our newer merchant marine. Electric drive—*a distinctly American contribution to water transportation*—has become a daily challenge to older, less efficient forms of ship propulsion.

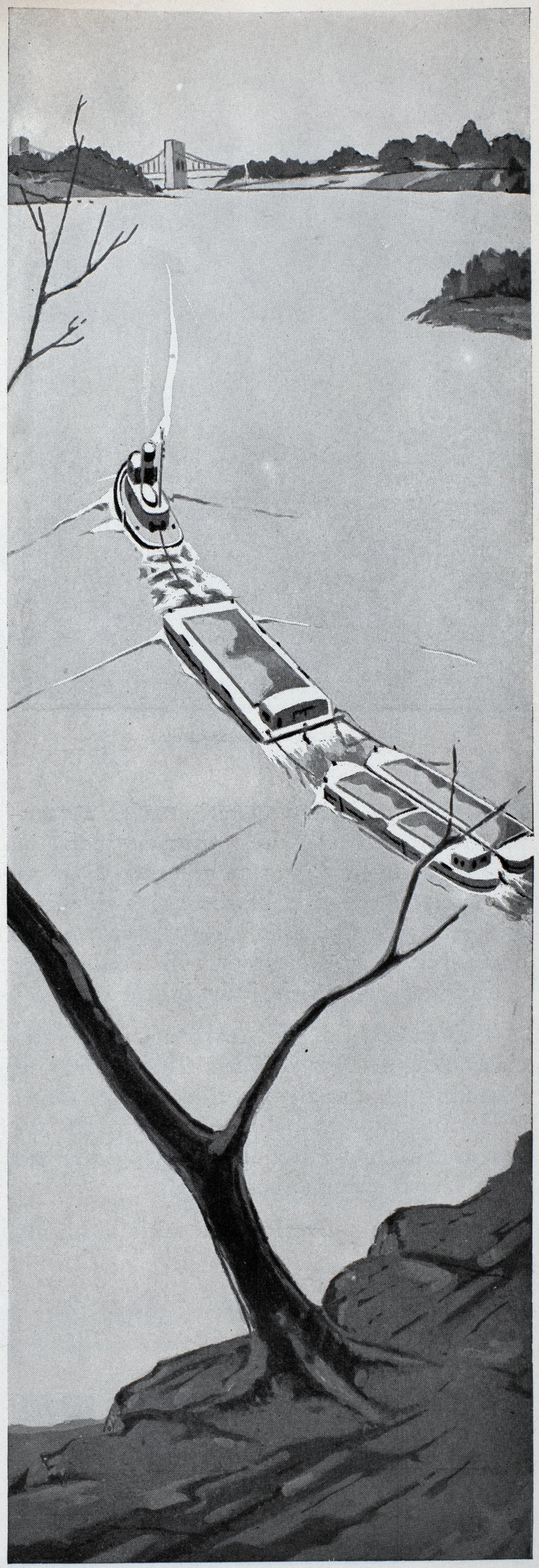
For turbine-electric drive has established new conceptions of ship comfort—a swift, clean passage, vibrationless beyond belief. And Diesel-electric drive has created new standards of fuel economy, maneuverability, and reliable operation.

To no one on the all-electric ship are the conveniences of electricity denied. It hoists the

cargo for the deck hands, it peels the potatoes for the chef, it lights the pilot on his course, and shoulders unnumbered irksome tasks.

Nor is electricity denied to any type of vessel. From mammoth liner to tiny tug, it serves in varied ways the interests of the owner. Its future use is not restricted in size or application by any known mechanical or electrical limitations. No other form of ship propulsion gives fairer promise of lasting satisfaction than electric drive.

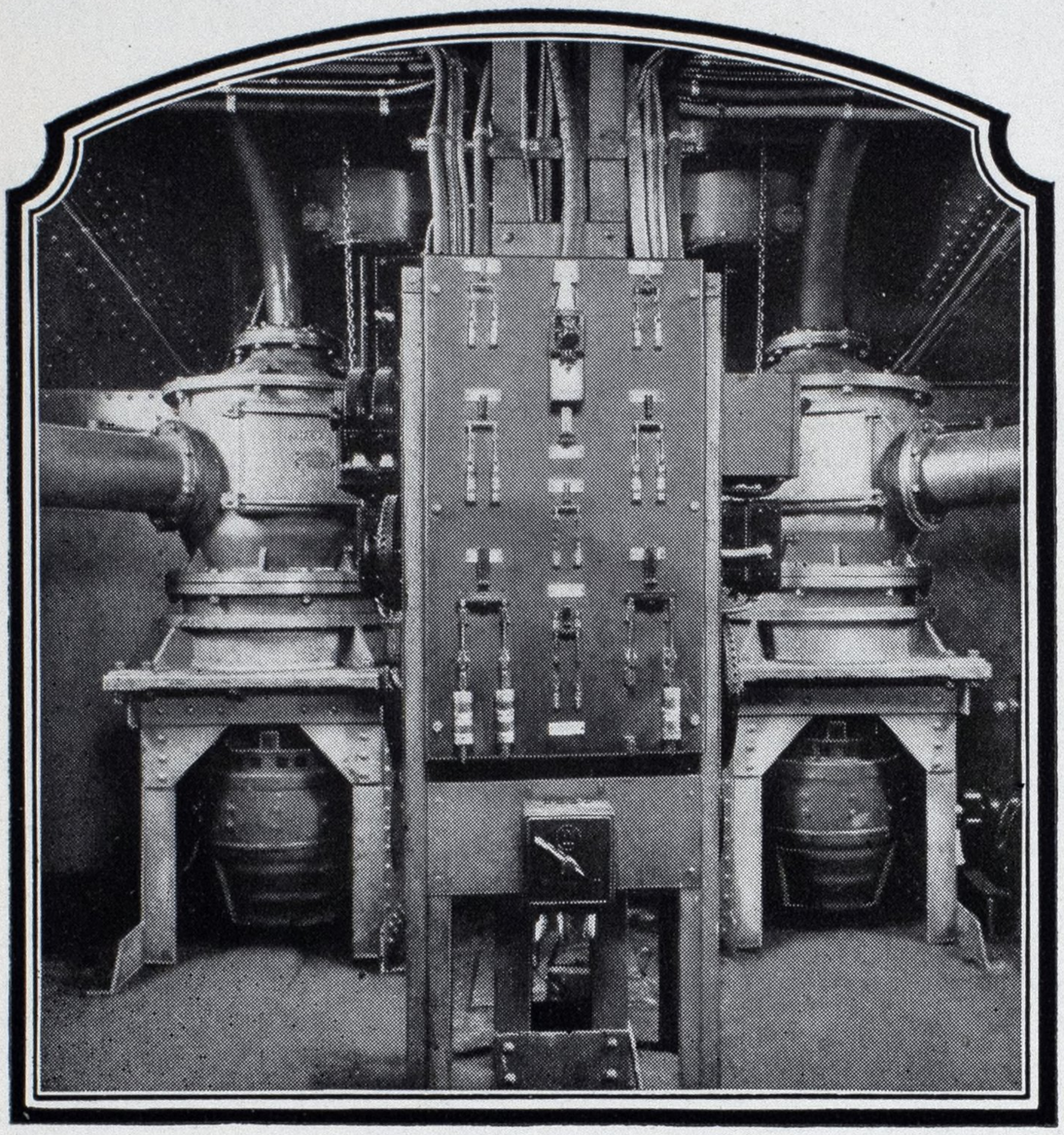
General Electric has long coöperated in furnishing electric drive and electric equipment for ships' auxiliaries. Its past accomplishments in this field, its sound engineering practices, and its extensive facilities are at the disposal of those ship operators who would keep in step with maritime progress.



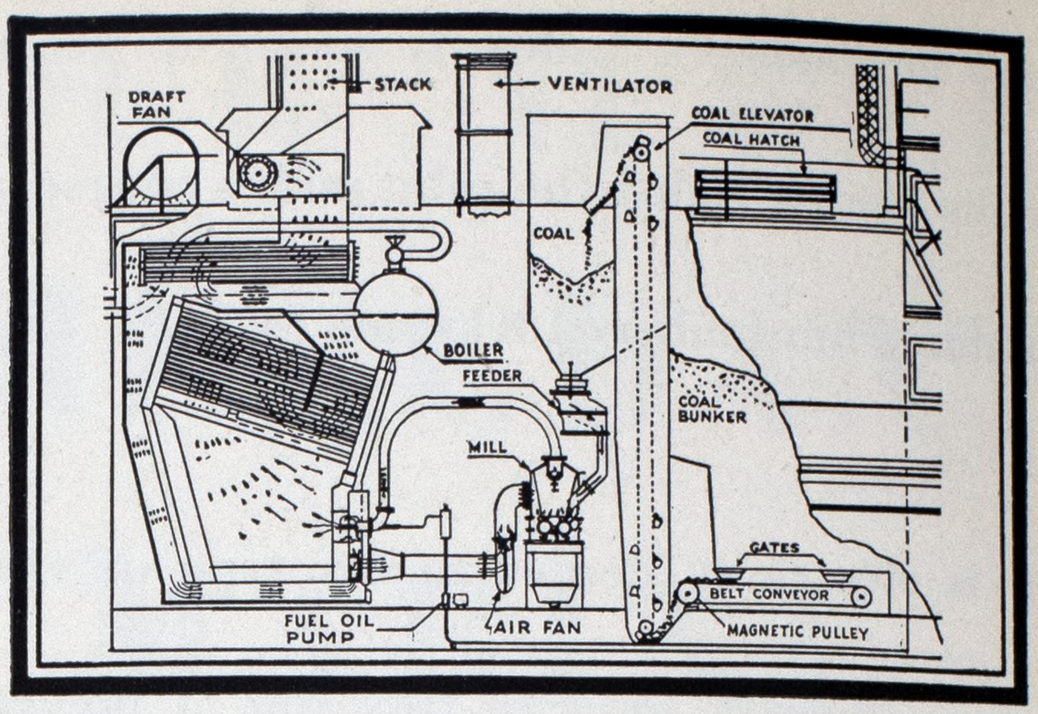
GE

173-11

GENERAL ELECTRIC



Fuller Lehigh Pulverizing Mills



Arrangement of boiler and pulverized-coal burning equipment

Towboat Dwight F. Davis Advantages of

Flexibility of boiler operation with a comparatively low fuel consumption per indicated horse-power-hour, as compared with an average western-river towboat, is well demonstrated by the satisfactory performance of Fuller Lehigh pulverized-coal firing equipment aboard the "Dwight F. Davis."

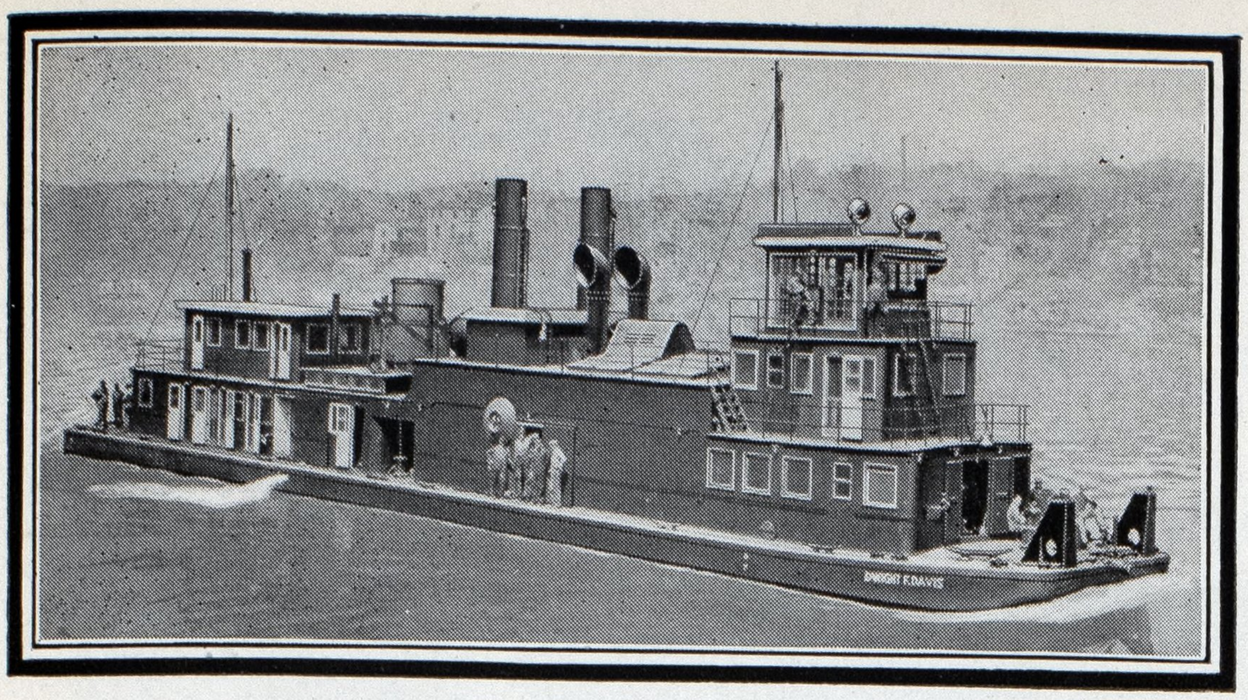
This vessel, the first towboat to be especially designed for pulverized-coal firing, is operating successfully on the Warrior River in competition with four similar towboats; two of which use fuel oil and two equipped with Diesel-electric power.

Using fine pulverization with a highly turbulent flame and the close proximity of the boiler tubes to the flame permits a greater amount of coal per hour to be burned efficiently, without boiler-tube slagging, than may be burned in a similar marine furnace using other methods of firing.

Also, the steam pressure remains constant as the fires require no cleaning nor is it necessary to remove ashes.

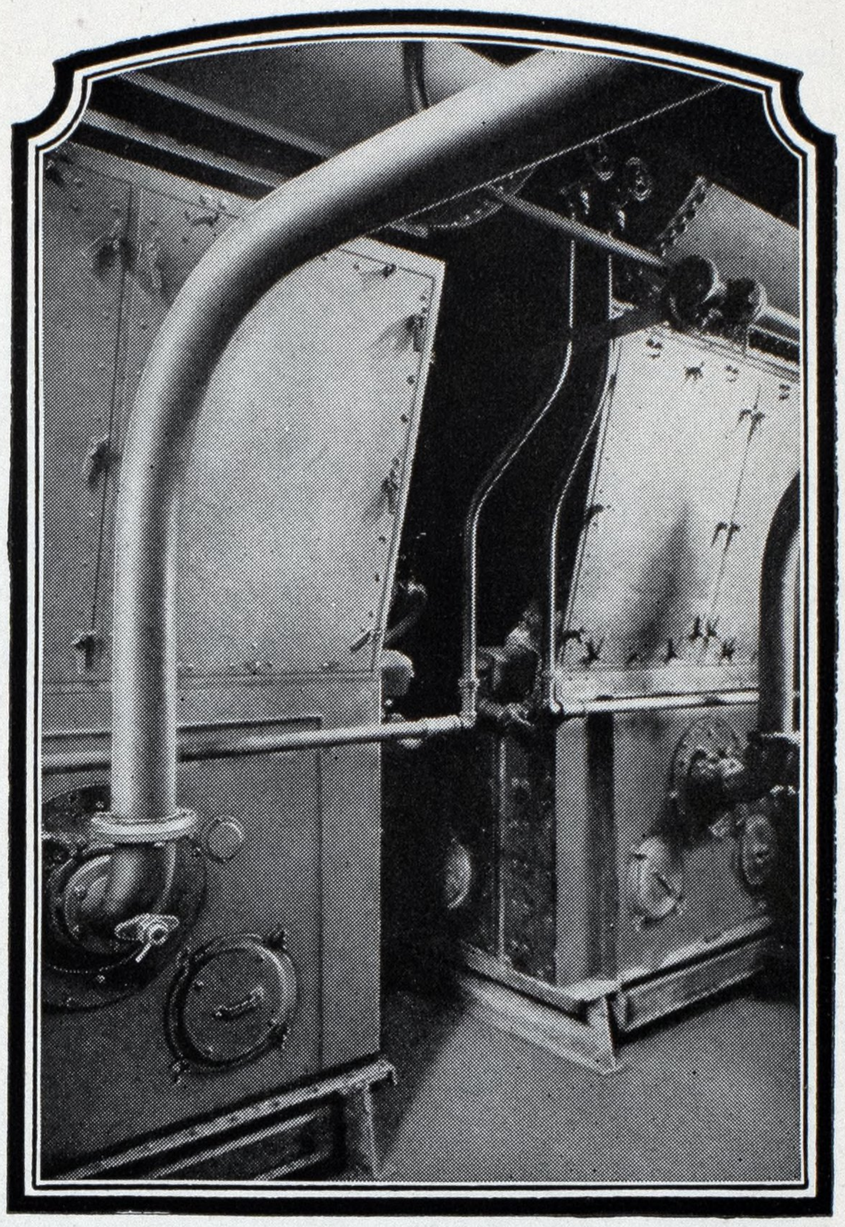
The coal is dried by the use of preheated primary air in the mills. The mills are operated under low air pressure which permitted the fan to be installed in the system ahead of the mills.

FULLER



"DWIGHT F. DAVIS"
Built by Charles Ward Engineering Works
Under direction of General T. Q. Ashburn
For Inland Waterways Corporation

Davis Demonstrates Pulverized-Coal Firing



Babcock and Wilcox Boilers
and Pulverized-Coal Burners

PULVERIZED-COAL EQUIPMENT—consists of one Pulverizing Mill (Air Separator Type) and one Turbulent Burner for each of the two Babcock and Wilcox Boilers.

SPACE REQUIREMENTS—Boilers, pulverizing mills, propelling machinery together with 130 tons of coal (sufficient for 7 days' run) require a floor space of only 1.25 sq. ft. per hp.

WEIGHT OF PULVERIZED-COAL EQUIPMENT—10,000 lb. per ton of pulverizing capacity.

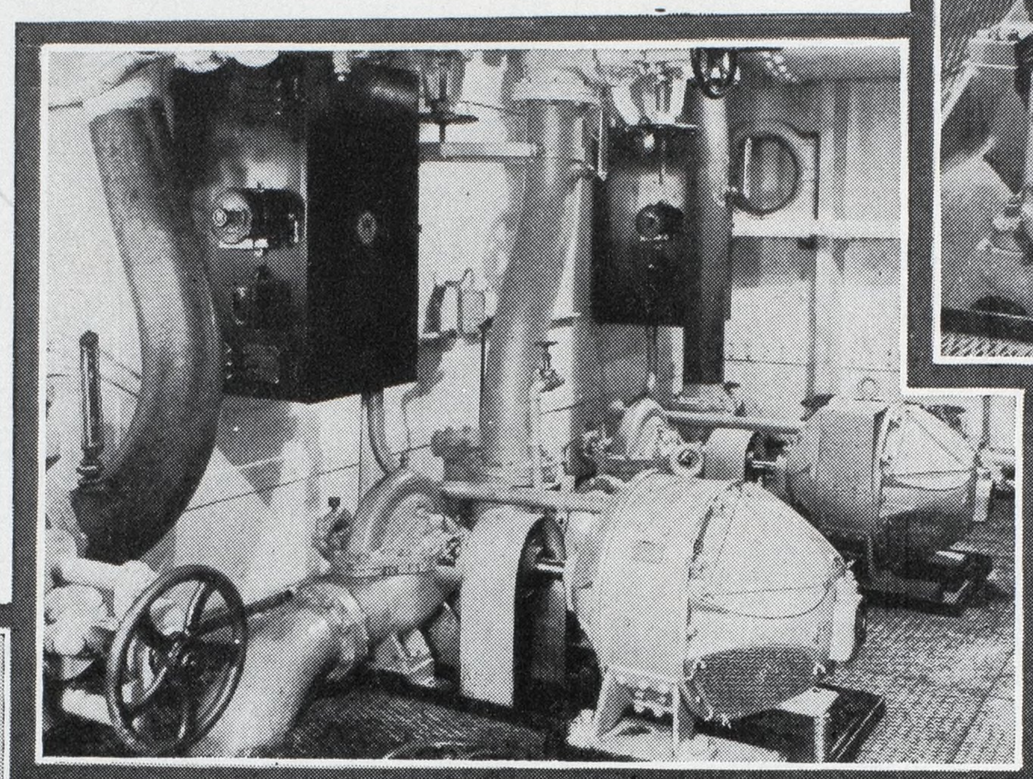
FURNACE DATA—Furnaces, plain refractory of approximately 250 cu.ft. volume. The normal coal consumption of each boiler amounts to approximately 750 lb. per hour which corresponds to a heat release of 42,000 B.t.u. per cu. ft. of furnace volume, although 1,500 lb. of coal per hour, corresponding to a heat release of over 84,000 B. t. u. has been burned without any evidence of slagging.

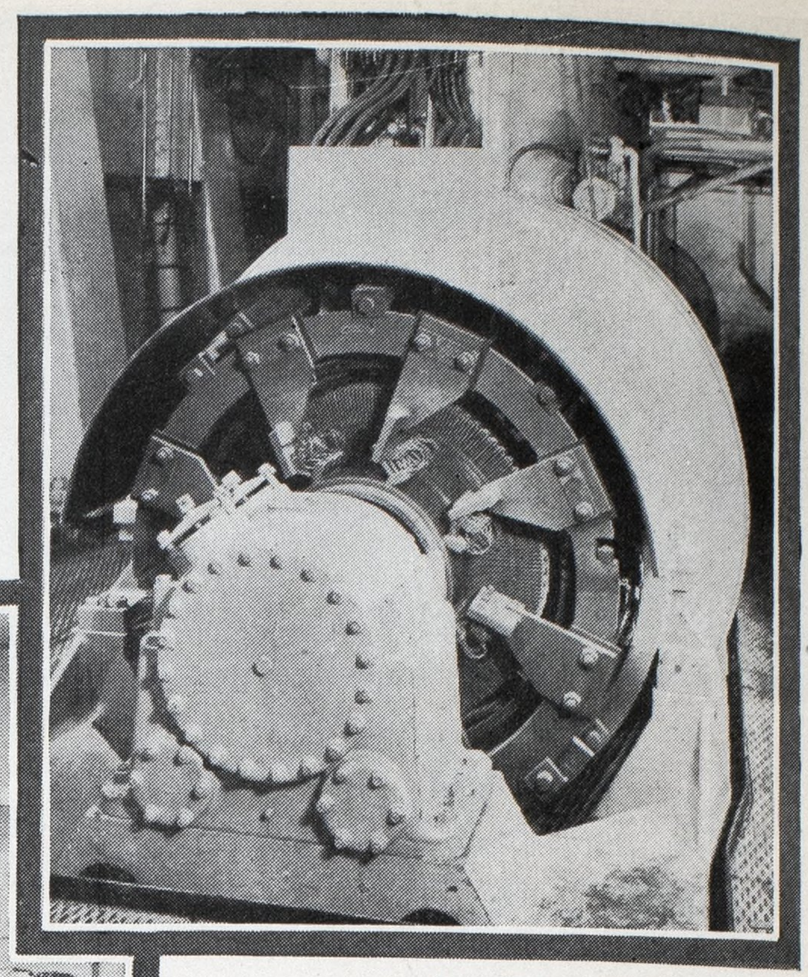
COAL CONSUMPTION—Preliminary tests indicate 1½ lb. of coal per hp.-hr. as compared with 3 to 4 lb. per hour used on the average western river towboat.

FULLER LEHIGH COMPANY, FULLERTON, PENNA. 1-113T-A
A BABCOCK & WILCOX ORGANIZATION

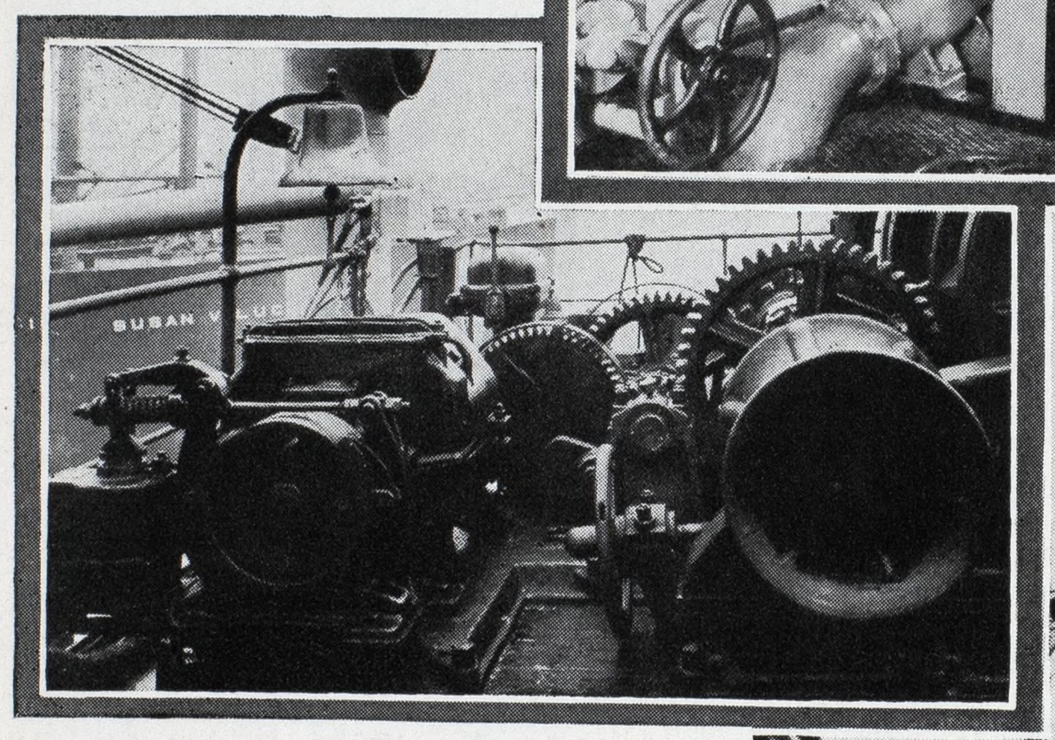
LEHIGH

Electric engine room pumps

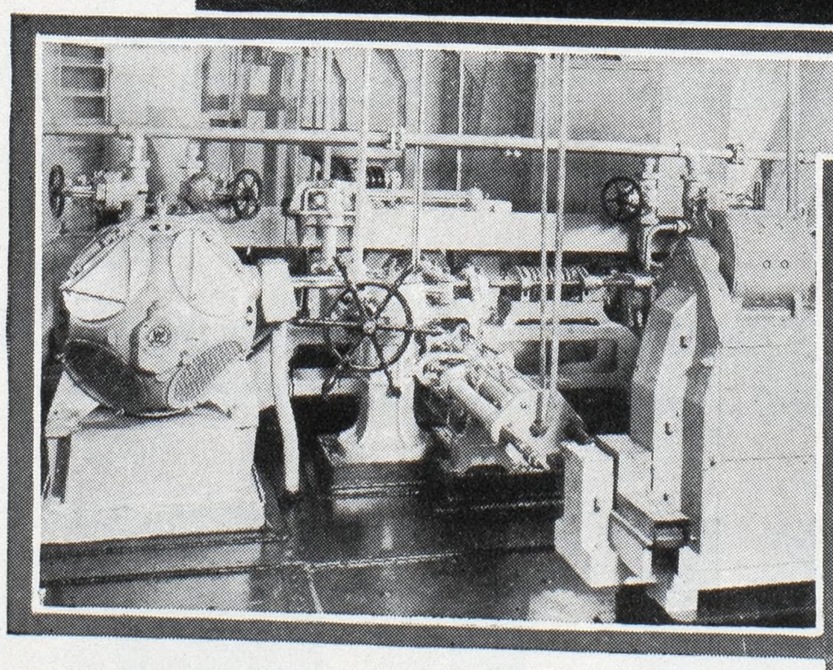




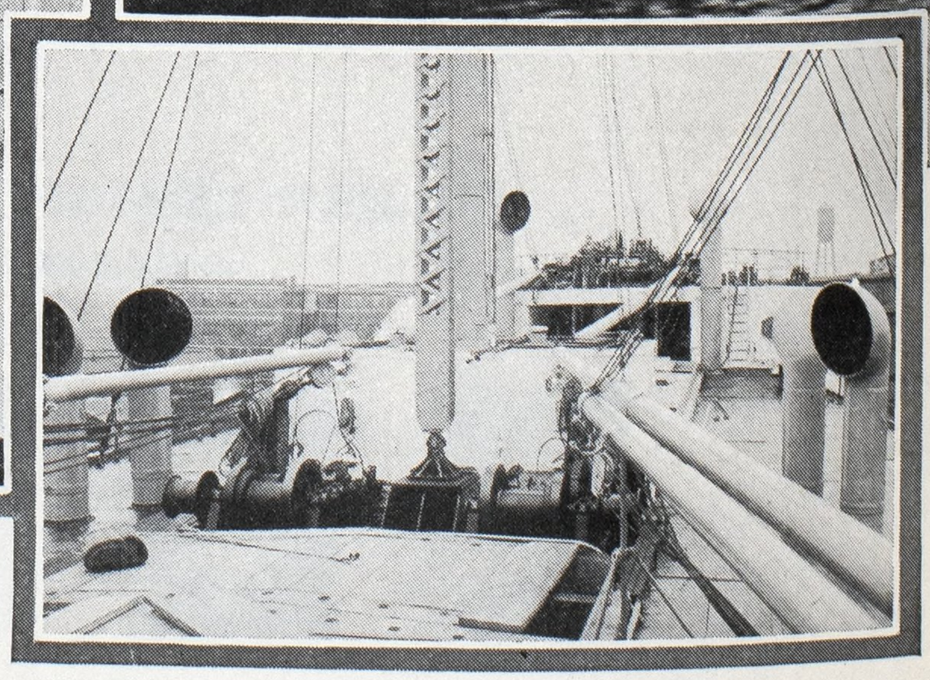
Auxiliary generator



Electric anchor windlass



Electric steering gear



Electric cargo winches

ELECTRIC Auxiliaries

on the City of New York



New motor liner *City of New York*

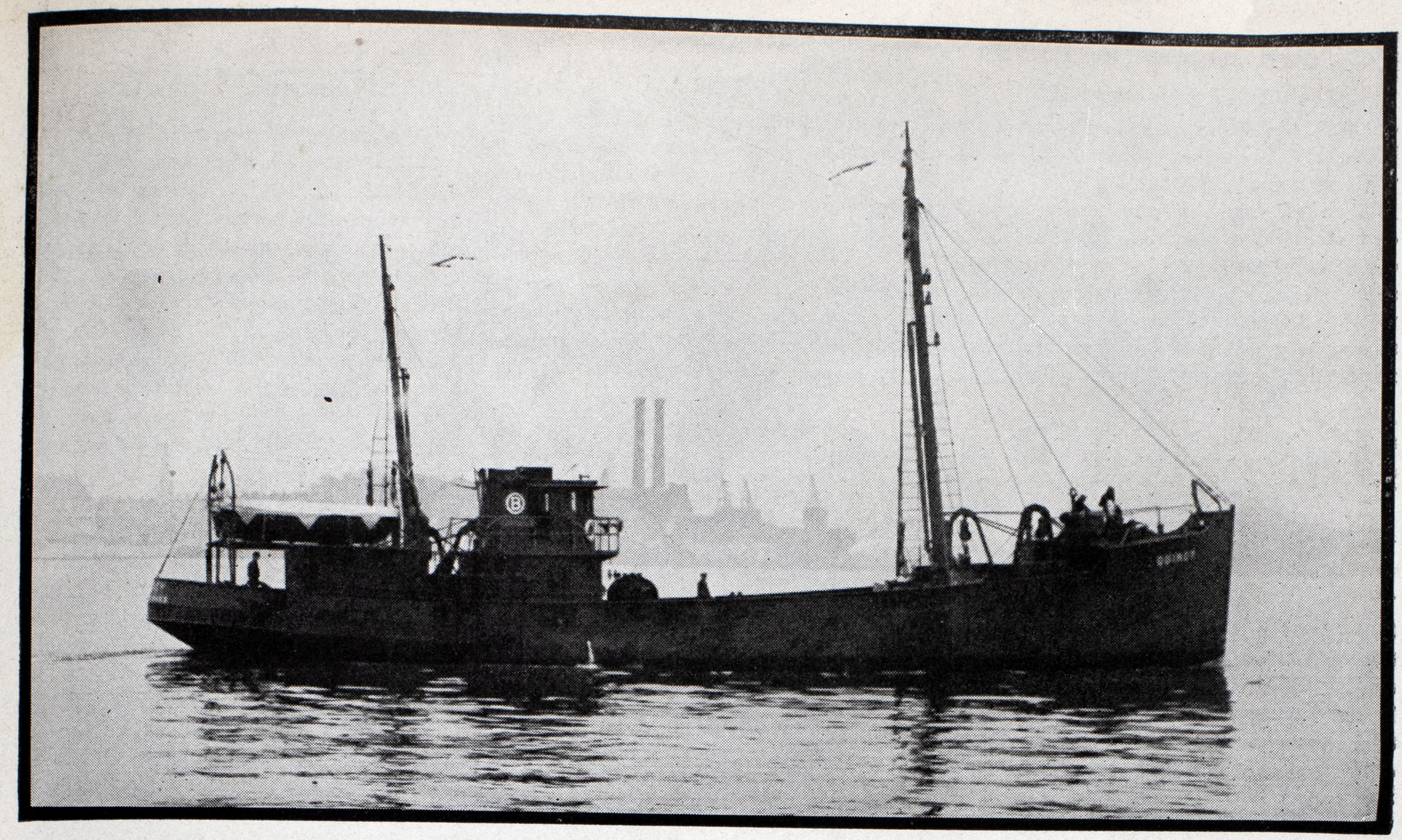
ELECTRIC auxiliaries on this new motor liner are effecting operating economies—through: fuel saving; elimination of steam and exhaust line maintenance; elimination of cargo damage from underdeck steam lines; safer and quicker handling of cargo and lower repair costs.

This ship's auxiliary machinery is completely equipped with Westinghouse Motors and Control.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

T 31198



Trawler *Quincy*, (Capt. Dennis Hayes) built for R. O'Brien & Co., Boston, Mass., under direction of B. F. and M. G. Whelan of that organization. 110 ft. overall, 22 ft. beam, 12 ft. 4 in. deep. Capacity 200,000 lbs. Accommodations for 14 men. Powered by Type 6 MI—18, 6 cylinder, 4 cycle, Nelseco Diesel, 350 H. P. at 280 R. P. M. Sister ship of *Dorchester* (Capt. Peter Hanson) and *Winthrop* (Capt. Kiernan Shean.) All three launched late in 1929.

Three New Trawlers

Powered by Nelseco Diesels

The *Quincy*, *Winthrop* and *Dorchester*, built by the Bethlehem Shipbuilding Company, at Quincy, Mass., for R. O'Brien & Company, widely known fish packers of Boston, Mass., combine the best features of both trawlers and draggers.

These boats, sister ships, are 110 ft. long, which makes them smaller than the usual trawler, and larger than the ordinary dragger. They retain many of the general lines of dragger design. The power plants are so compact, and the design so space-saving, that each boat has a capacity in excess of 200,000 pounds of fish and ice—a quantity that places these vessels on even terms with much larger craft, at a saving of about one-third in initial investment and a corresponding saving in operating costs.

The main engine in each boat is a Nelseco Diesel, rated 350-h.p., at 280 r.p.m., and designed for 20% overload. The lubricating oil consumption of this widely popular engine is especially low, amounting to only ⅛ gallon per hour at full load, mainly due to recent modifications of the lubricating system, which provide full forced feed to all main, connecting rod, wrist pin and crankshaft bearings, and mechanical lubrication to each cylinder. The fuel oil is pre-heated before injection, materially assisting in atomizing the oil and improving the fuel oil consumption by about 5%. Pre-heating is accomplished by a "U" tube—a by-pass from the exhaust line—which is inserted in a small tank, holding about 2½ gallons of fuel oil, attached to the engine.

The range of Nelseco Diesel engines includes types for tow-boats, yachts, passenger, freight and fishing vessels of all types. We shall be glad to send you complete information. Write for Catalog MR.

ELECTRIC BOAT COMPANY

New London Ship and Engine Works, Groton, Conn., U. S. A.

NELSECO

New York Sales Office: 247 Park Avenue, New York City. ***Original licensees from and collaborators with M. A. N. since 1910***

Chicago Representative	*Boston Representative*	*West Coast Representative*	*Memphis Representative*
H. JACOBSEN	C. J. O'NEILL	KING-KNIGHT CO.	J. S. BRONSON
25 North Dearborn St., Chicago, Ill.	10 High St., Boston, Mass.	Seattle, San Francisco, Los Angeles	1348 Madison Ave., Memphis, Tenn.

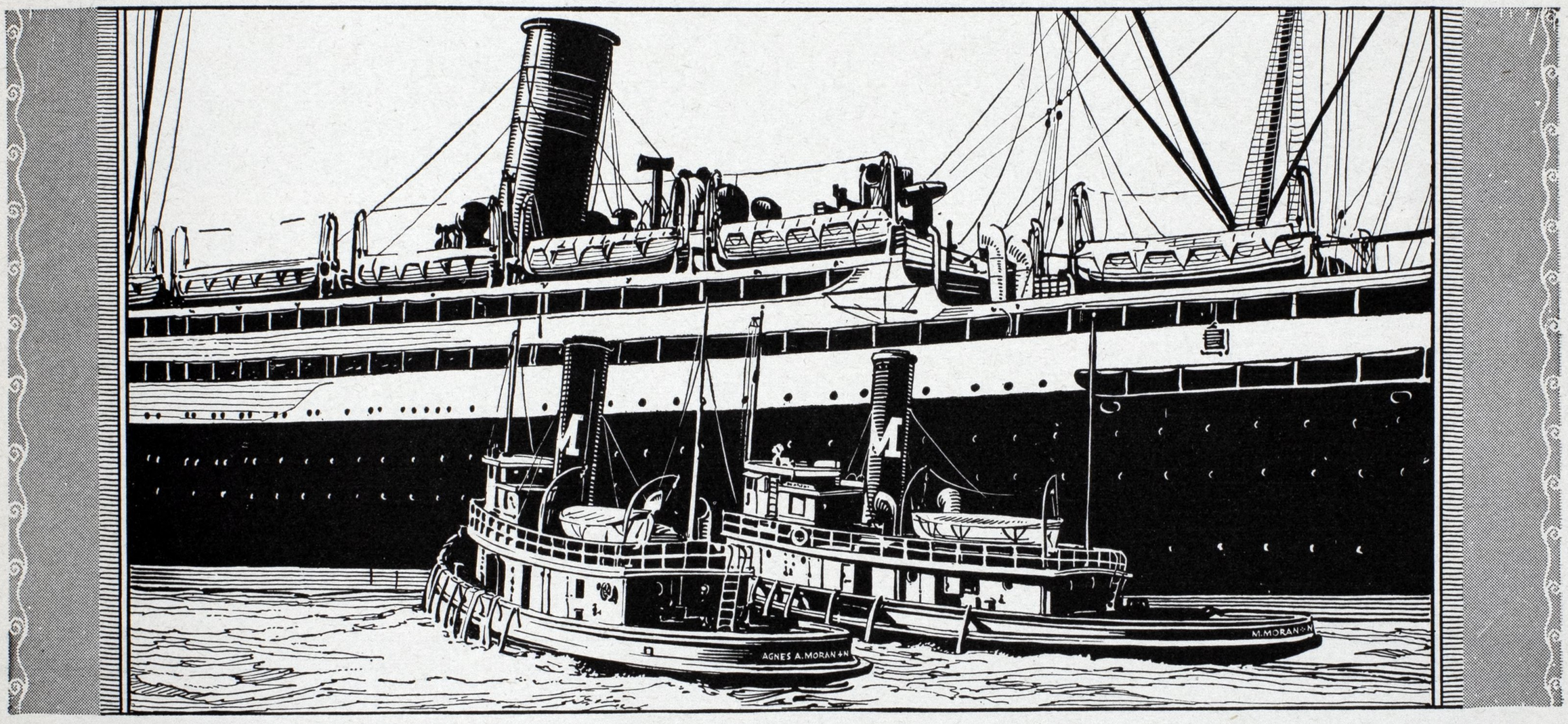
A Moran Executive is Always Available

THE character of Moran Docking Service eliminates any possibility of inadequate facilities.

The most modern, efficient equipment for the docking and undocking of vessels of the largest or smallest tonnages are immediately available day or night.

The Moran Docking Fleet is preëminent in the Port of New York and is manned by a personnel of wide experience and sound training.

A Moran executive is always available.



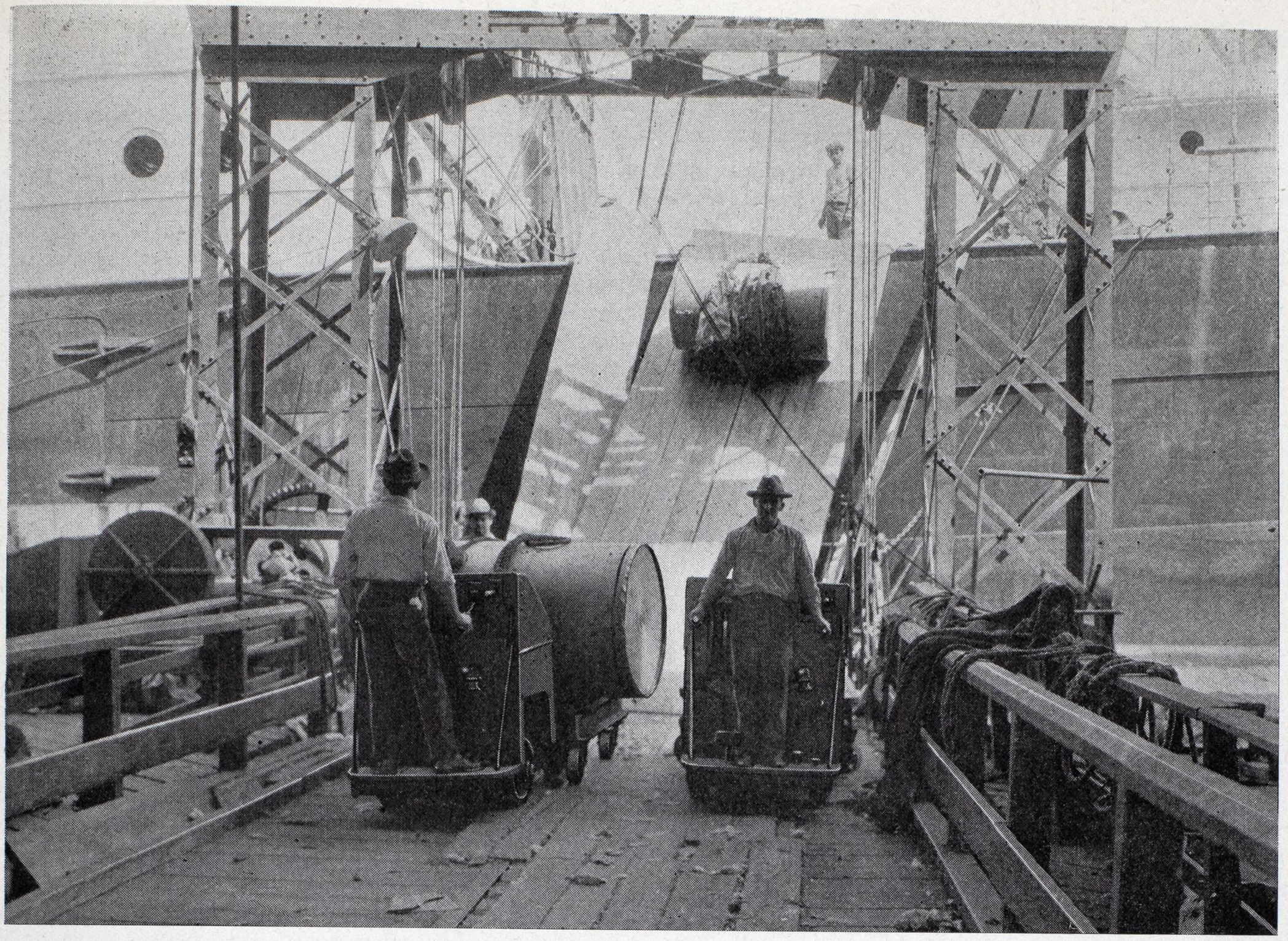
OVER SIXTY-EIGHT YEARS IN SERVICE

Day and Night Service Every Day and Night in the Year

MORAN TOWING AND TRANSPORTATION COMPANY, INC.

17 Battery Place, New York—Whitehall 1340

MORAN Service



The cheapest stevedore labor is expensive when compared to the low operating cost of the powerful, agile, untiring Clark "Truclift."

CLARK **TRUCLIFT** handles cargo at lower costs

REG. U. S. PAT. OFFICE

Loading and unloading costs shrink, with Clark "Truclifts" on the wharf. Gaspower multiplies man power—all cargo handling operations are simplified, speeded.

This sturdy unit is powerful because it has the rugged standard tractor engine used in all Clark vehicles. Lifts and carries its load.

Agile because it's built to negotiate narrow aisles, crowded wharfs, uneven floors. Never stops to rest on a steep ramp. Speed—1 to 6 miles per hour.

Untiring because it's gas powered—good for 24 hours continuous service and just as fresh the last hour as the first.

Available in four standard models—2, 3 and 5 ton capacity. Powerful lift elevates load in 7 seconds.

Send for illustrated bulletin.

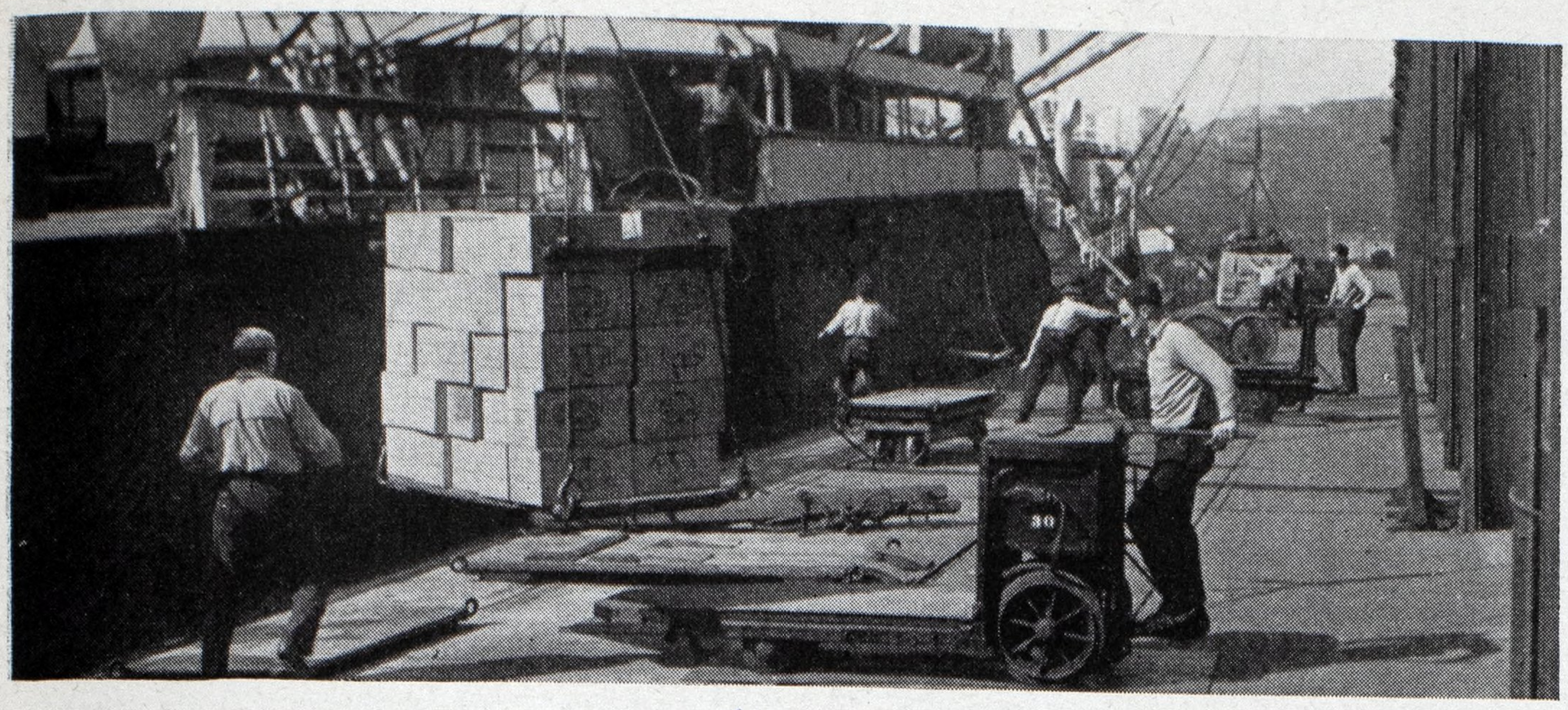
These Clark "Truclifts" are widely used by steamship lines. Write for bulletin and definite figures of cargo handling costs.

The Clark Tructractor Co.

Battle Creek, Mich.

Attach this ADVERTISEMENT to your inquiry

IN THE FOUR CORNERS OF THE WORLD



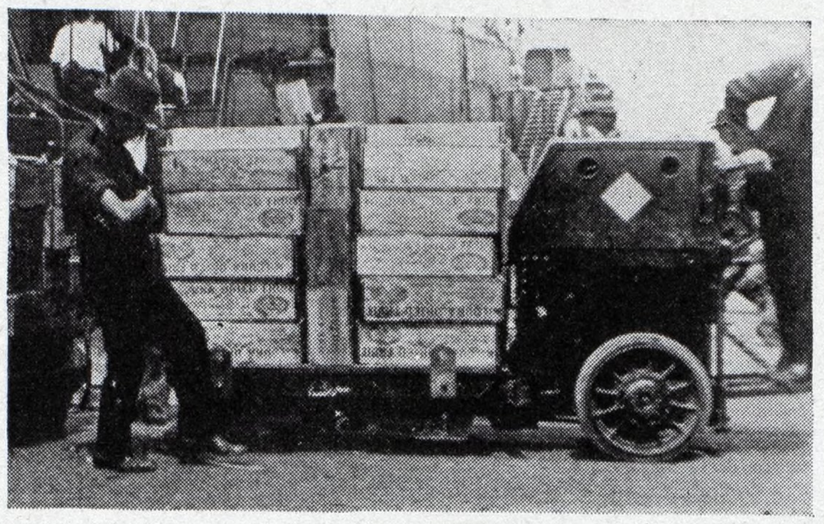
San Francisco



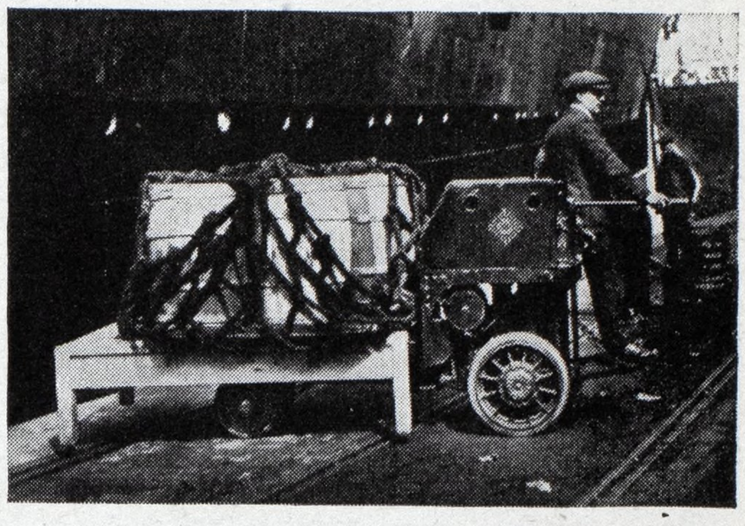
Savannah



India



Australia



England

MARINE TERMINALS ARE SERVED BY ELWELL-PARKER ELECTRIC TRUCKS

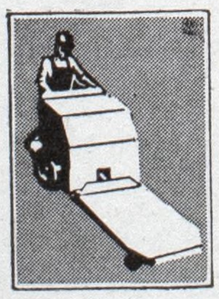
It is a fact surprising to many American operators, that foreign terminals are in many cases, more completely equipped with modern electric trucks than some terminals in the United States.

Even in the far corners of the world, you are quite likely to see Elwell - Parker Electric Trucks working along the docks and in the warehouses. Wherever they are used big savings in handling costs are being made. Cargo is handled faster. Labor cost is reduced. Ships are released sooner. One coastwise shipping company was able to remove one steamship from service through the use of E-P Electric Tructors.

Elwell-Parker Electric Tructors are made in types and sizes to handle every kind of cargo. Carrying approximately eight times the load of a hand truck and traveling three times as fast as a man walks, they reduce the cost of terminal operation to a remarkable degree. Would you like definite facts and figures? We'll be glad to have an Elwell-Parker Engineer call and give you the story. He knows marine terminal handling and may give you some valuable tips. Just drop a line to Elwell-Parker in Cleveland.

On an Elwell-Parker Tructor, the power can be applied to the wheels before brake is released. A fully loaded Tructor can thus be stopped and started on a ramp without danger of slipping back. Your safety committee will appreciate the importance of this advantage.

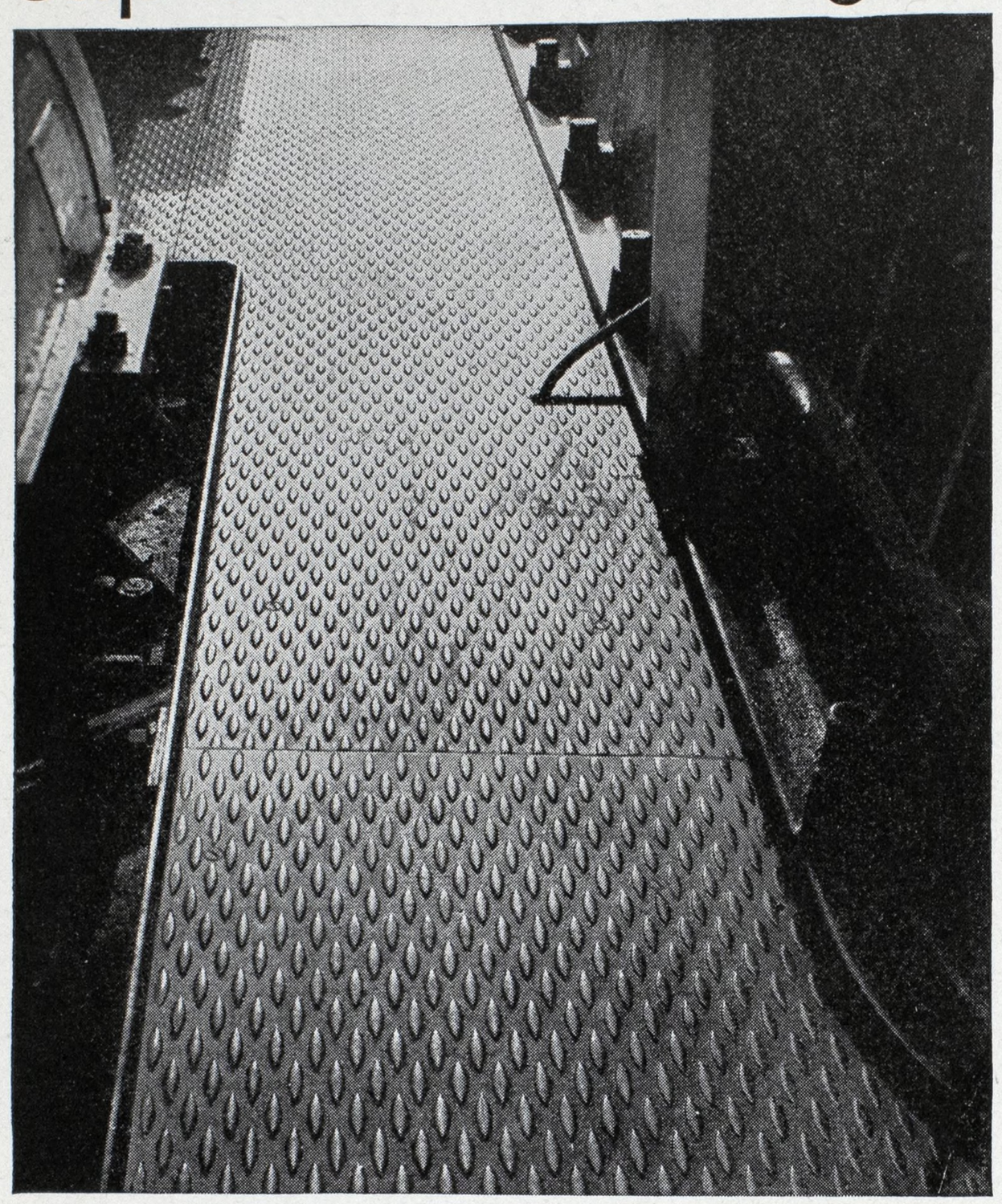
The Elwell·Parker Electric Co.

Designers and Builders  ***of Electric Industrial Trucks, Tractors and Cranes for 24 years***

4200 St. Clair Avenue, Cleveland, Ohio

SHIP ON SKIDS ***Tructors***

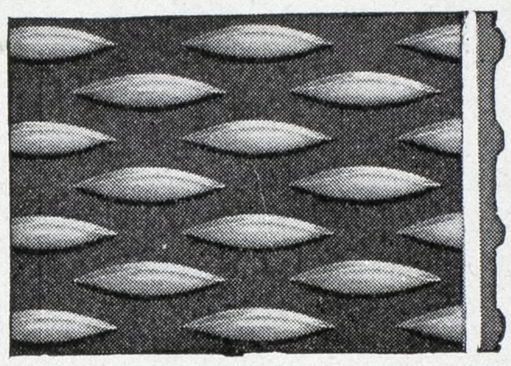
Slip-Proof Flooring on the "Seneca Sun"



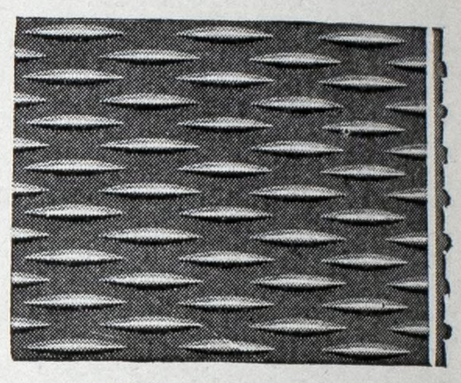
FEET get a sure, certain grip on the raised, oval-shaped bevel-edged diamonds in the pattern of "A. W." Floor Plate. Walking is safer at all times. Particularly when the ship is rolling, the traction and anti-slip qualities of "A. W." Floor Plate are appreciated.

Because the diamonds have rounded tops (an exclusive feature of "A. W." Floor Plate) there are no flat raised areas to hold water or oil. Drainage is complete from every angle.

"A. W." Floor Plate is available in two patterns, shown below. Both are rolled in thicknesses, widths and lengths as needed, and are furnished in steel as well as all commercially-rolled metals. Write for samples and booklets.



"A. W." Diamond
(¼ size)



"A. W." Diamondette
(¼ size)

ALAN WOOD STEEL CO.

CONSHOHOCKEN, PA.

Philadelphia
New York
Boston Dallas

Seattle
San Francisco
Los Angeles

TRUSCON

STEEL BOXES AND SKID PLATFORMS

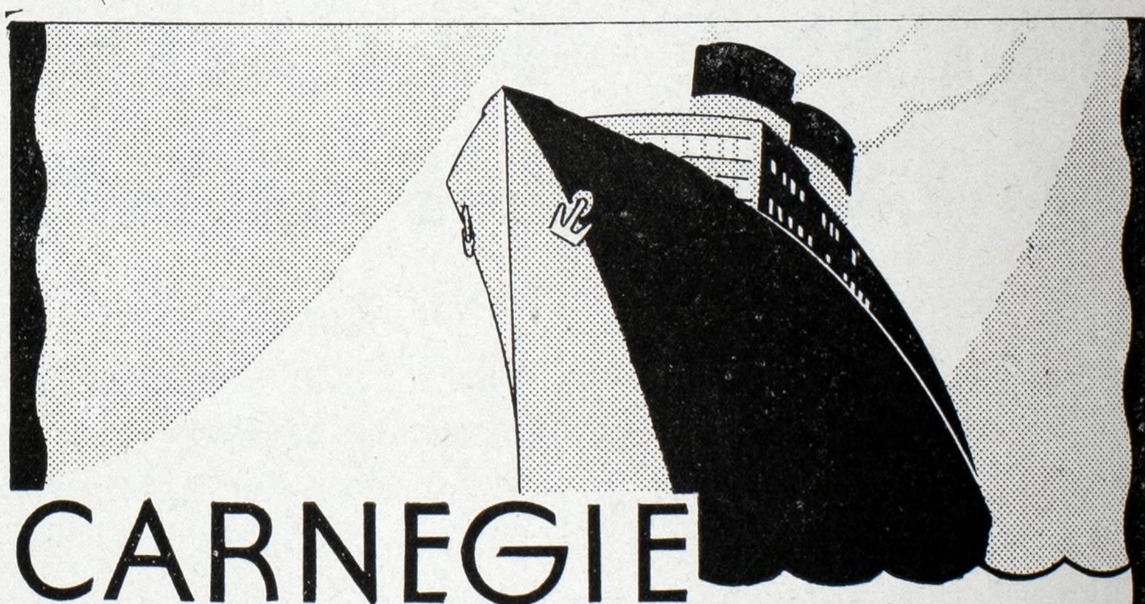
Shipments are handled with less labor and in quicker time where Truscon Steel Boxes, Skid Platforms and Six-Wheel Factory Trucks are used. They are furnished in types and sizes to meet every condition. Our engineers will give full information and useful suggestions.

TRUSCON STEEL COMPANY

Pressed Steel Division
6100 Truscon Ave.
Cleveland, Ohio



PRESSED TRUSCON & DRAWN STEEL



CARNEGIE SHIP BUILDING PRODUCTS

A complete line of structural steel sections for shipbuilding purposes, including Carnegie Beams with their wide, parallel flanges, shipbuilding channels and bulb angles, Carnegie Floor Plate in a raised pattern insuring long wear and easy cleaning, and rolled steel plates of every description.

The name "Carnegie" has been identified with steel manufacture for nearly three-quarters of a century—a good name to look for on Steel.

CARNEGIE STEEL COMPANY
Subsidiary of United States Steel Corporation
PITTSBURGH, PA.

62

Your Engineers Want This Information



UNDER Linde Procedure Control, welding operators are specially instructed in and qualified for the particular type of work they are to do. They are then capable of repeatedly producing a product of known and uniform strength. This, together with the five other important requirements of Procedure Control, assures full designed strength in every oxwelded joint so made.

The Pioneers in Procedure Control for Oxwelding

LINDE OXYGEN
The Linde Air Products Co.

~

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Co., Inc.

~

Oxweld
Apparatus and Supplies
Oxweld Acetylene Company

~

UNION CARBIDE
Union Carbide Sales Co.



Units of

UNION CARBIDE AND CARBON CORPORATION

General Offices UCC *Sales Offices*

30 East 42nd Street, New York, N. Y. In principal cities of the country

65 Linde plants—48 Prest-O-Lite plants—174 Oxygen Warehouse stocks—156 Acetylene Warehouse stocks—42 Apparatus Warehouse stocks—245 Carbide Warehouse stocks

WHITLOCK
PAT'D AUG. 3, 1926. REG. U.S. PAT. OFF.
WATERFLEX
CORDAGE



Whitlock **WATERFLEX** Manila is *water-resisting;* the fibre remains permanently lubricated.

WATERFLEX rope is practically unaffected by dampness, rain or continued immersion in water.

Annoyances caused by swelling, hardening and kinking are eliminated.

WATERFLEX when wet, remains flexible and continues to handle easily and to run smoothly through blocks and over sheaves. Even a new hawser of large size can be spliced readily *wet or dry.*

WATERFLEX may be left outdoors in all kinds of weather with the assurance of protection against deterioration or *wet rot*, which shortens the serviceable life of ordinary rope.

No additional charge is made for the patented **WATERFLEX** feature.

Our claims of absolute superiority for **WATERFLEX** cordage have been thoroughly proven in the most severe kinds of marine and other service.

FIBORE — *the original Fibre-Core Rope* — made water-resisting by our **WATERFLEX** treatment, is unquestionably the strongest and most efficient type of large cordage ever developed.



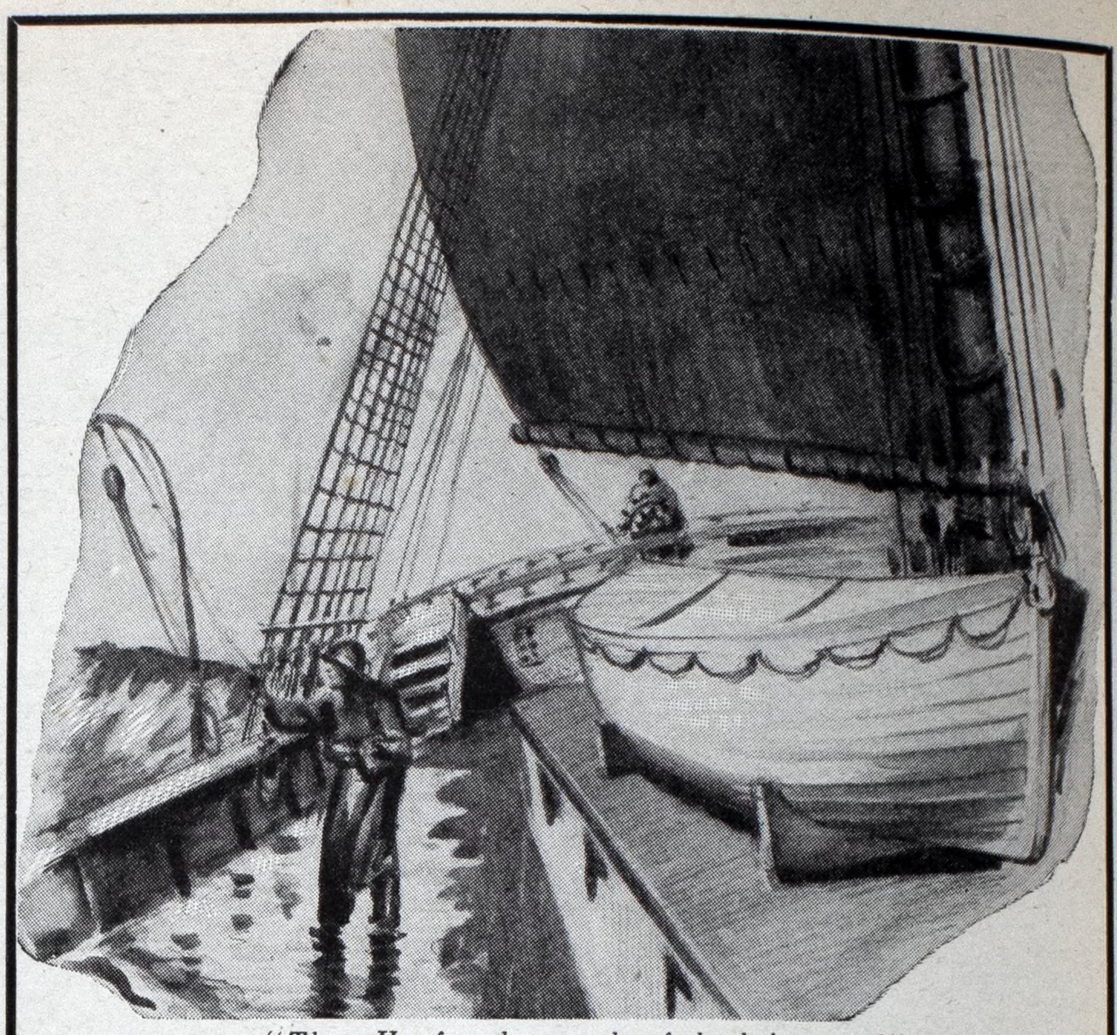
Ordinary Rope Wet

Waterflex "Wet"

WHITLOCK CORDAGE COMPANY
46 South Street, New York

Factory and Warehouses
Jersey City, N. J.

Branches
Chicago, Boston, Kansas City *and* Houston



"Then Ho for the swash of the briny wash"

In heavy weather, a tight deck is just as important as tight seams. Poor deck caulking means ruined cargoes, wet sleeping quarters, food spoilage and many annoyances.

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{Continued on following page}

Read these construction features

All oil that comes in contact with products of combustion is purified before being returned to the oil reservoir.

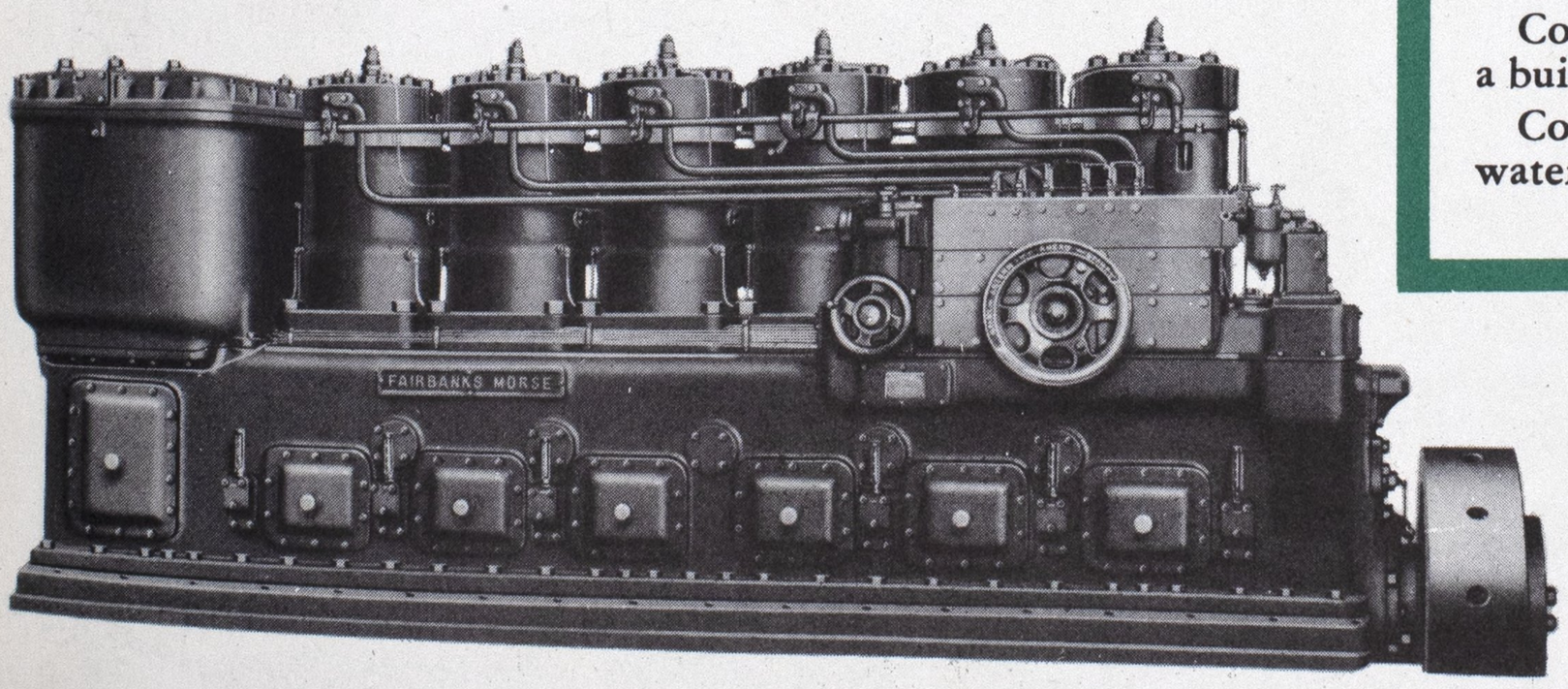
A triple check on the performance of each cylinder is provided by {1} thermometers attached to piston cooling oil return lines, {2} thermometers on cooling water discharge outlets and {3} pyrometers on exhausts.

The pistons are oil cooled in a simple and positive manner.

A continuous pressure lubricating system is employed.

Combustion air is supplied by a built-in low pressure pump.

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Six cylinder F-M Diesel Engine, Model 37 {cylinder size 10½ in. x 12½ in.}.

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POWER, PUMPING AND WEIGHING EQUIPMENT



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The "John J. Gallagher" of New York. Powered with a 700 hp. Model 37 F-M Diesel.

{Continued from preceding page}

The combining of the piston oil cooling and pressure lubricating systems necessitated placing the oil reservoir in the crankcase. Consequently, a built-in low pressure air pump was provided to supply combustion air to the cylinders.

For four years this development has been proved on all types of craft in all waters. Its success has been responsible for Fairbanks-Morse extending these unique features to a complete line of marine engines ranging from 250 to 1200 hp., designated as "Model 37."

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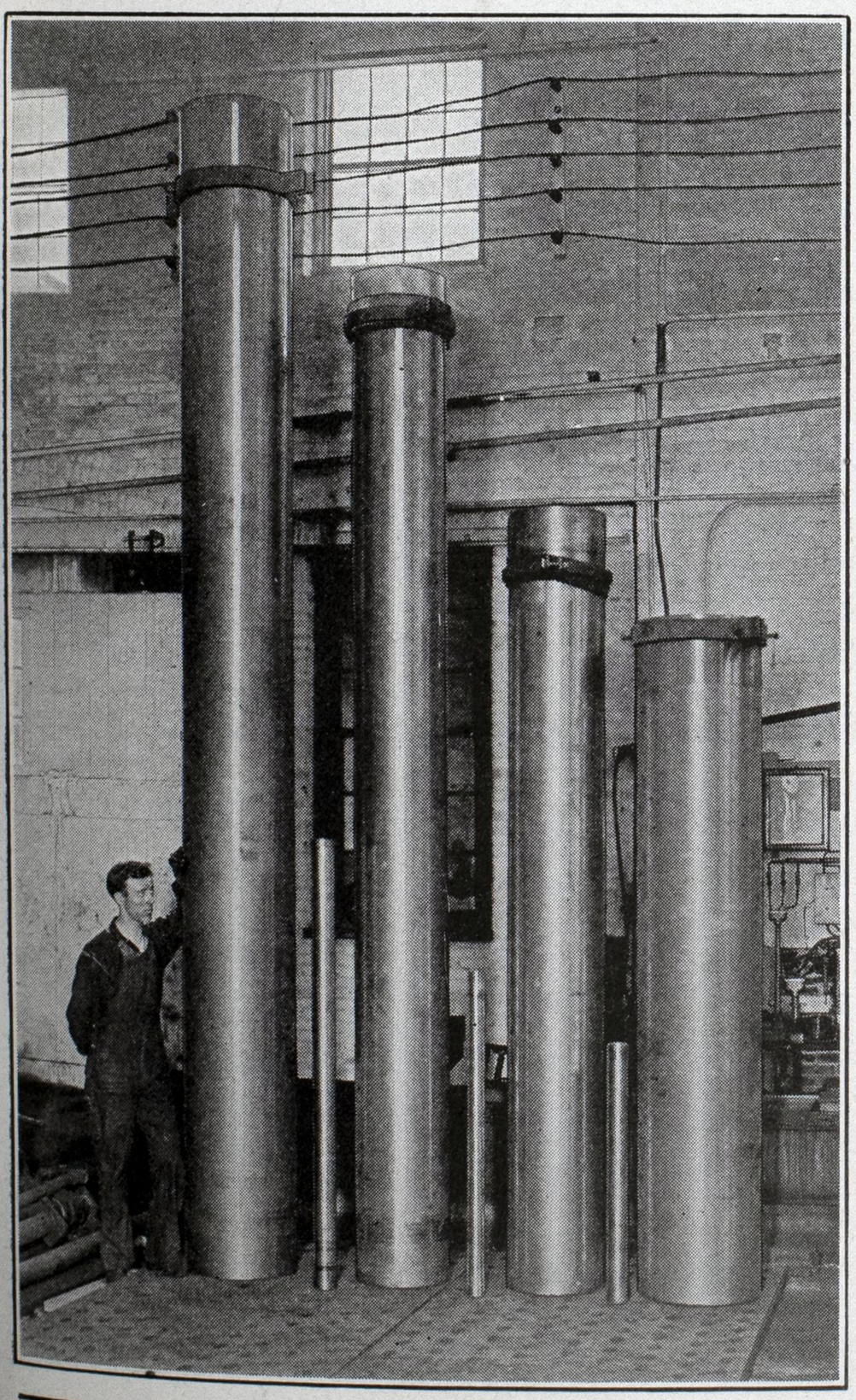
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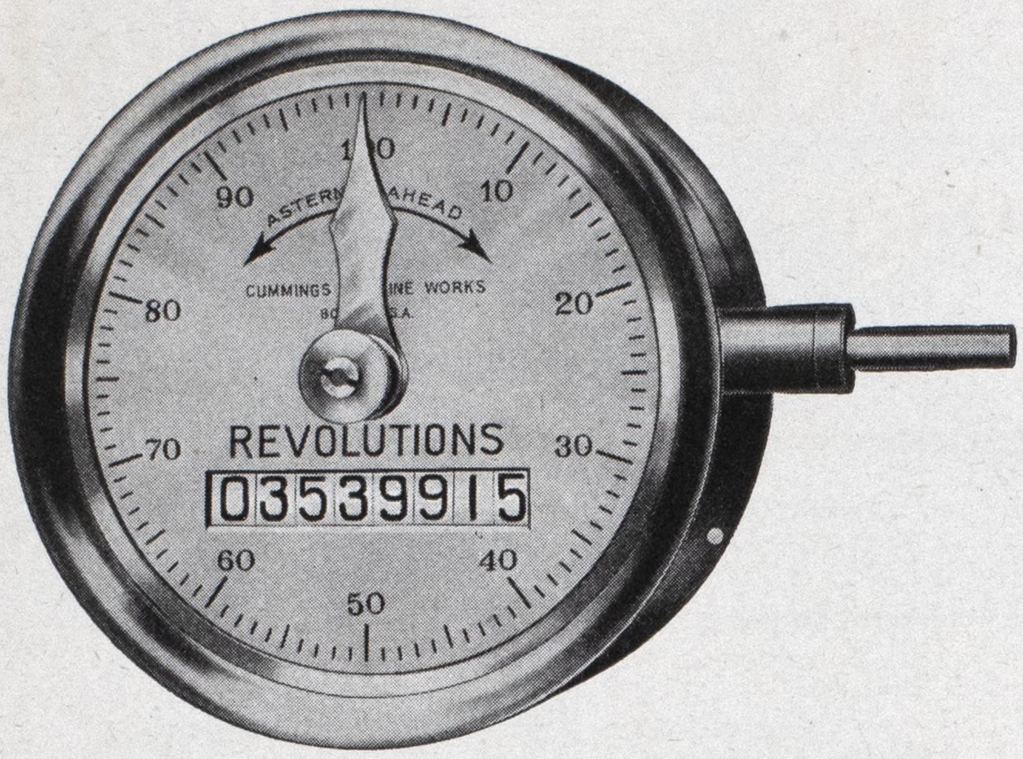
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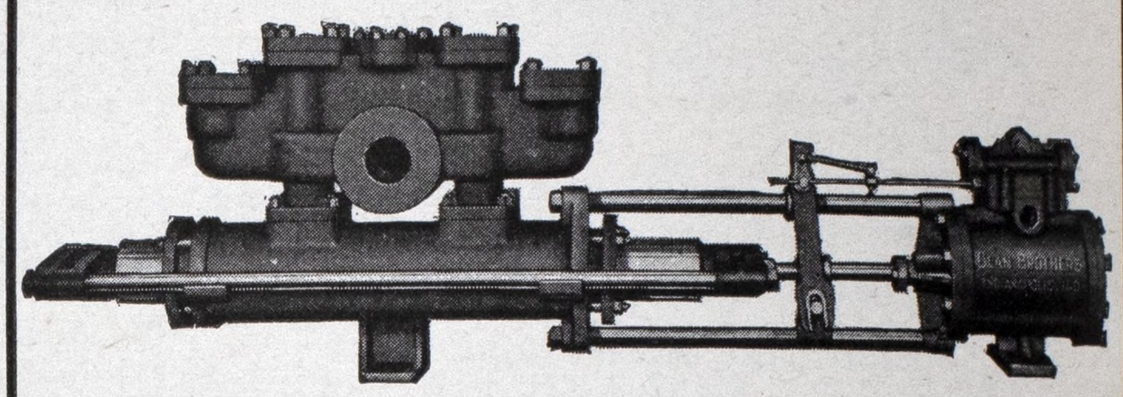


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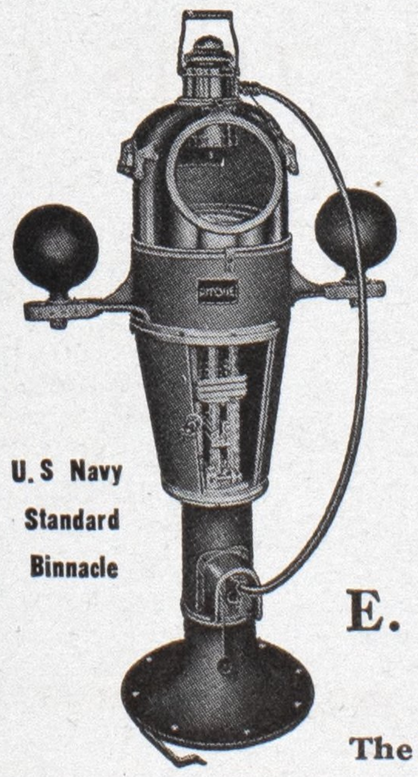
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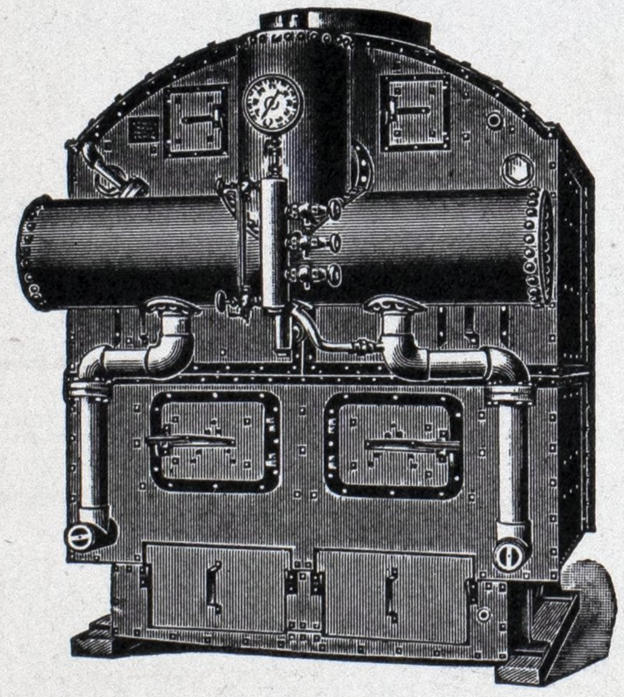
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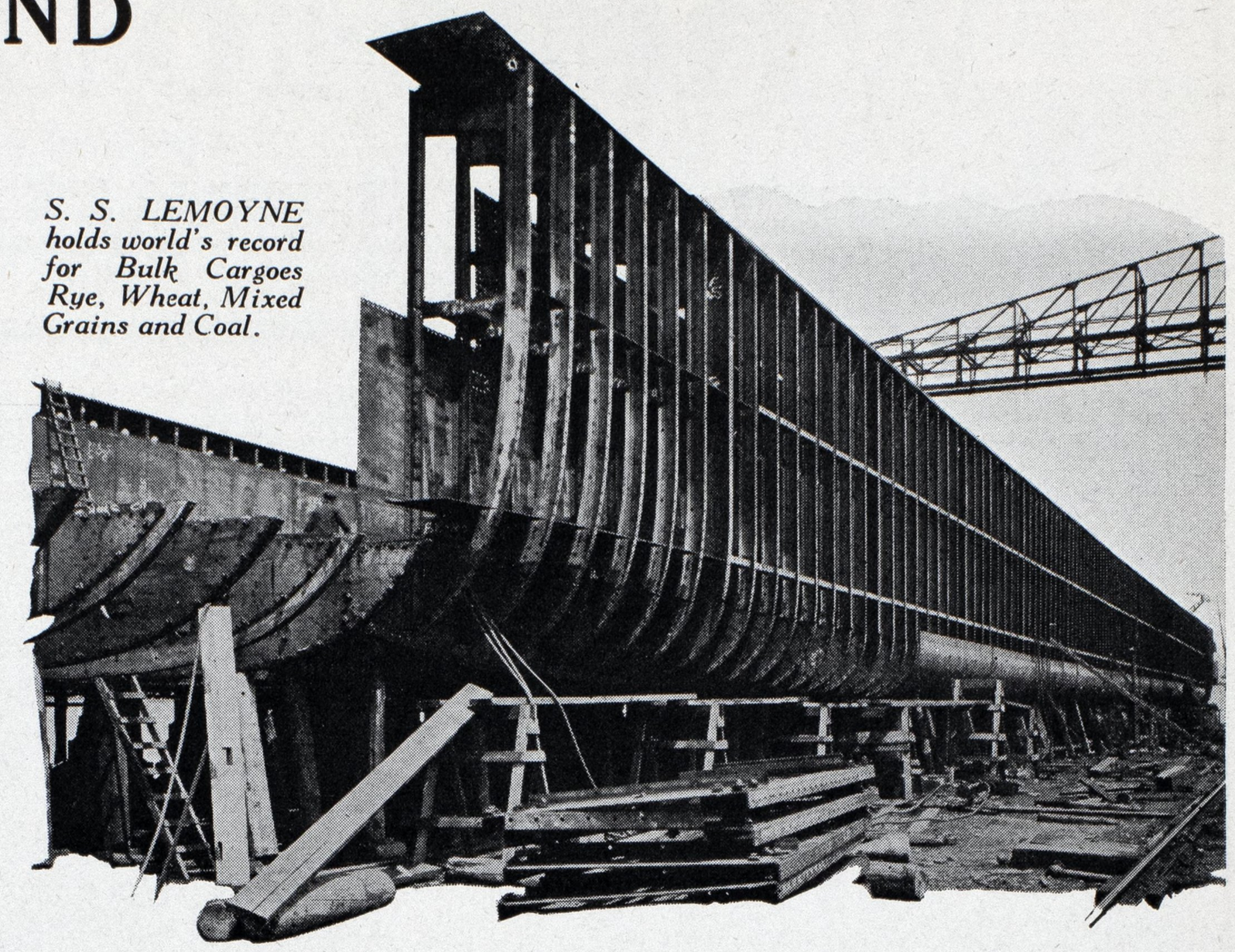
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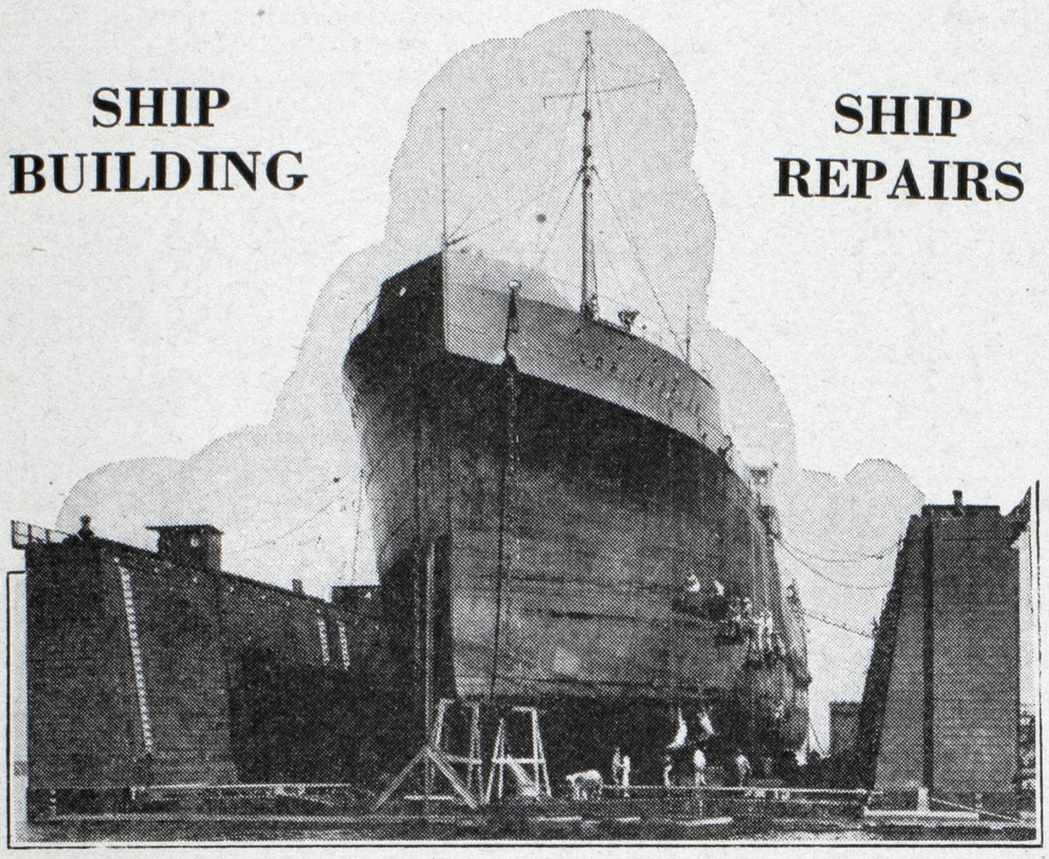
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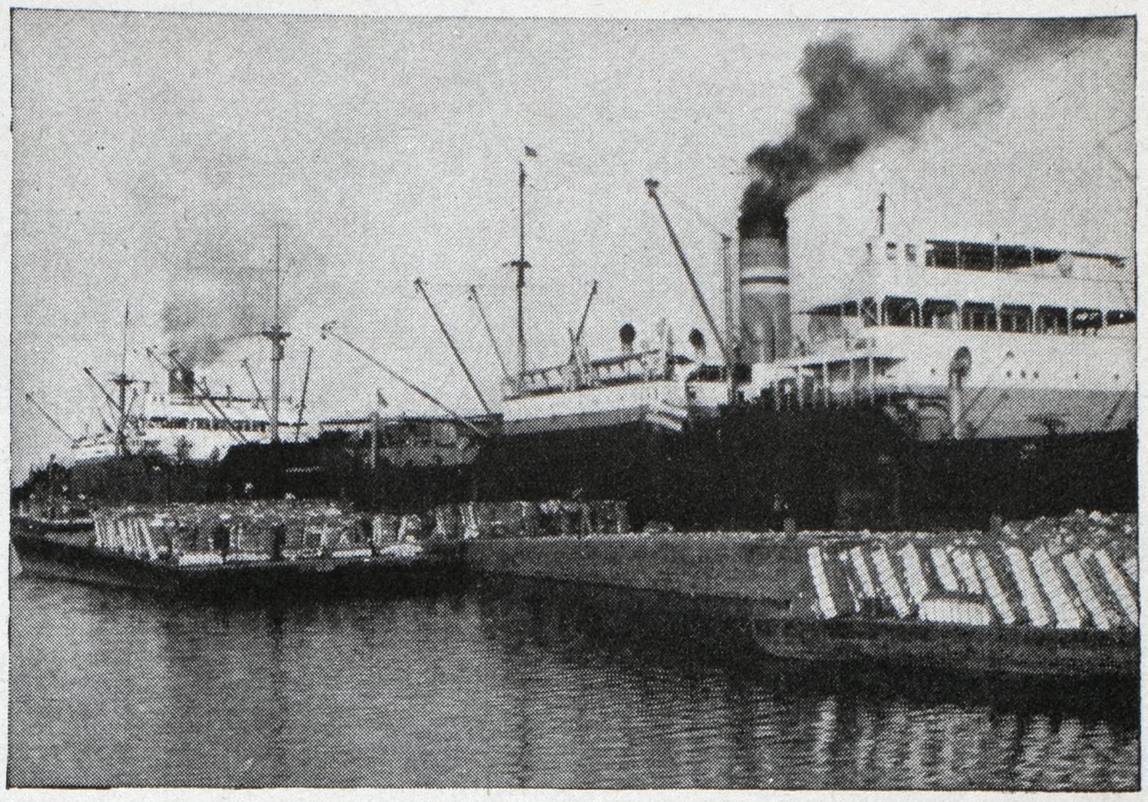
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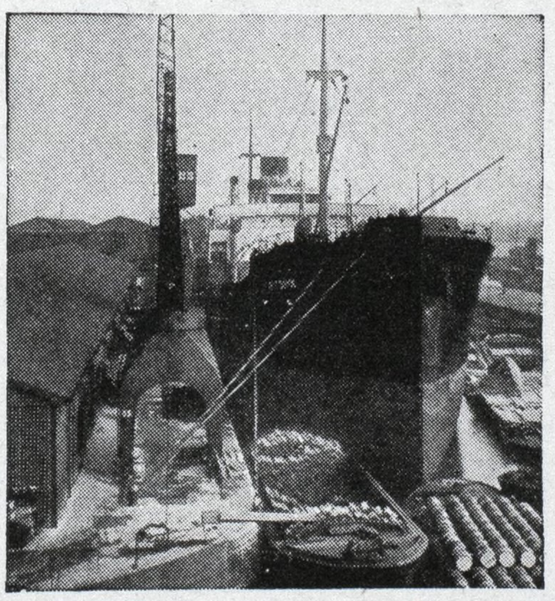
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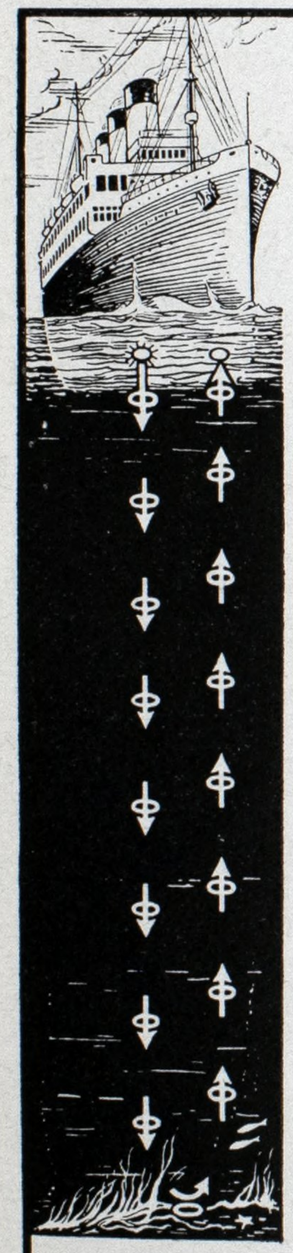
A daily scene in the busy port of London—an American vessel discharging cargo at Surrey Commercial Dock. This is typical of the advantageous ship-to-shore contacts made by the modern American freighters of the 17 Shipping Board lines listed at the right

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Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Canada Steamship Lines, P. O. Box 2430, Montreal, Can.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sturtevant, B. F., Co., Inc., Hyde Park, Boston, Mass.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.
Winton Engine Co., 2116 W. 106th St., Cleveland, O.

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Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co., 11Broadway, New York City.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Worthington Pump & Machinery Co., Harrison, N. J.

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Dake Engine Co., Grand Haven, Mich.

ENGINES (Vertical, Enclosed, Self Oiling)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.

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EVAPORATORS
Griscom-Russell Co., 285 Madison Ave., New York City.

FANS (Electric)
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

FEED WATER HEATERS—See HEATERS AND PURIFIERS (Feed Water)

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Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

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Carnegie Steel Co., Carnegie Bldg., Pittsburgh, Pa.

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Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

FORGINGS
Erie Forge Co., 15th & Cascade Sts., Erie, Pa.
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

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Hamburg-American Line, 39 Broadway, New York City.

FUEL OIL
Standard Oil Co. of New Jersey, 26 Broadway, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

FURNITURE
Marble & Shattuck Chair Co., 10200 Foster Ave., Cleveland, O.

FURNITURE (Metal)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

GALLEY RANGES
Stamford Foundry Co., Stamford, Conn.

GEARS (Marine Equipment)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

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Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

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Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

GENERATORS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

GRAPHITE
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE GREASES
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE PAINT
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE PIPE JOINT COMPOUNDS
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRATINGS (Steel)
Dravo-Doyle Co., Pittsburgh, Pa.

GRATINGS & TREADS
Dravo-Doyle Co., Pittsburgh, Pa.

GREASE
Vacuum Oil Co., 61 Broadway, New York City

GREASE (Launching)
Vacuum Oil Co., 61 Broadway, New York City

GYPSEYS
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.

GYRO-PILOT (Automatic Steering)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

HAMMER RAMS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

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Mullholland Hatch-Fastener Co., Marion Bldg., Cleveland, O.

HAWSERS (Manila)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

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Griscom-Russell Co., 285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.
Worthington Pump & Machinery Co., Harrison, N. J.

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Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

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American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Ingersoll-Rand Co., 11 Broadway, New York City

HOISTS (Electric, Pneumatic, Hand)
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.

INDICATORS (Direction & Revolution)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

INDICATORS (Helm Angle)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

INDICATORS (Speed)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

ICE MACHINES—See REFRIGERATING MACHINERY

INSURANCE (Marine)
Boland & Cornelius. Marine Trust Bldg., Buffalo, N. Y.

IRON (Bar)
Wrought Iron Co. of America, Lebanon, Pa.

IRON (Engine Bolt)
Wrought Iron Co. of America, Lebanon, Pa.

IRON (Staybolt)
Wrought Iron Co. of America, Lebanon, Pa.

LAMPS (Mazda and Arc)
General Electric Co., Schenectady, N. Y.

LIFEBOATS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp., 3-5 Vernon Ave., Long Island City, N. Y.

LIFESAVING EQUIPMENT
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

LIGHTING EQUIPMENT
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

LUBRICATING OIL
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Vacuum Oil Co., 61 Broadway, New York City.

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American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Cooper-Bessemer Corp., The, Grove City, Pa.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

MACHINES (Sounding)
Submarine Signal Co., 160 State St., Boston, Mass.

MACHINISTS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts., St. Louis, Mo.
New York Shipbuilding Co., Camden, N. J.

MAGNETS (Lifting)
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)

MARINE RAILWAY BUILDERS
Crandall Engineering Co., Cambridge, Mass.

MATERIAL HANDLING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

MATTRESSES
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

METERS (Gas & Air)
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

METERS (Water & Oil)
Worthington Pump & Machinery Co., Harrison, N. J.

MOTOR GENERATOR SETS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

MOTORS (Electric)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NAUTICAL INSTRUMENTS
Ritchie, E. S., & Sons, Brookline, Mass.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

NAVIGATING INSTRUMENTS
White, Kelvin & Wilfrid O., Co., 112 State St., Boston, Mass.

NITROGEN
Linde Air Products Co., 30 East 42nd St., New York City

OAKUM (Marine, Rope, Packings, Plumbers)
Stratford, George, Oakum Co., 165 Cornelison Ave., Jersey City, N. J.

OIL BURNING EQUIPMENT
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Coen Co., 610 S. Broadway, Los Angeles, Cal.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

OIL CLARIFIERS
Sharples Specialty Co., Westmoreland, Philadelphia, Pa.

OIL PURIFIERS
Sharples Specialty Co., Westmoreland, Philadelphia, Pa.

OIL FOR ALL PURPOSES (Marine)
Vacuum Oil Co., 61 Broadway, New York City.

OXY-ACETYLENE APPARATUS
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

OXYGEN
Linde Air Products Co., 30 East 42nd St., New York City.

PAINT BURNERS (Acetylene)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

PASSENGER SERVICE
Hamburg-American Line, 39 Broadway, New York City.

PISTON RODS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

PLATES (Sheared Steel)
Alan Wood Steel Co., Conshohocken, Pa.

PLATES (Steel Floor)
Alan Wood Steel Co., Conshohocken, Pa.

PLATFORMS (Skid)
Truscon Steel Co., Pressed Steel Div., Youngstown, Ohio.

PORTABLE LIGHTS (Acetylene)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

POWDERED COAL BURNERS
Coen Co., 610 S. Broadway, Los Angeles, Cal.
Fuller Lehigh Co., Fullerton, Pa.

PROPELLER BLADES AND HUBS
Sheriffs Mfg. Co., Milwaukee, Wis.

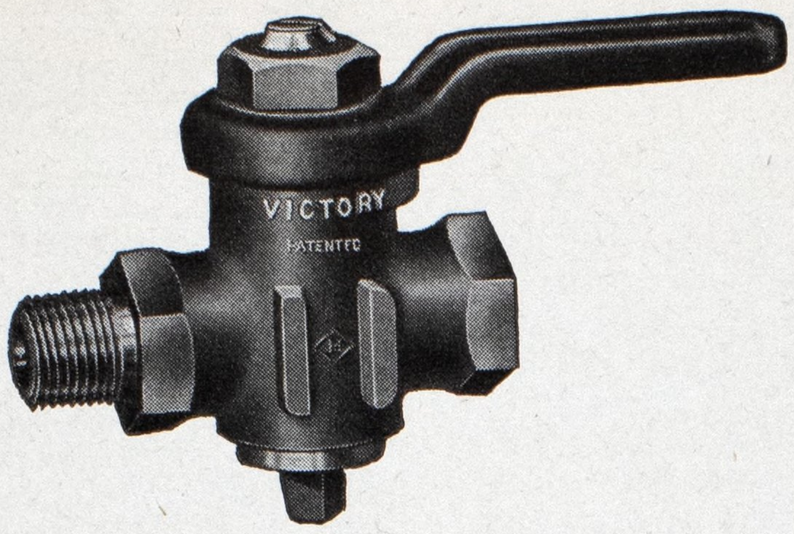
PROPELLER WHEELS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works, River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.
Trout, H. G Co., 220 Ohio St., Buffalo, N. Y.

PROPELLERS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.

PULVERIZED COAL BURNERS
Fuller Lehigh Co., Fullerton, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.

PUMPS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

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Hamburg-American Line

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Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warren Steam Pump Co., Inc., Warren, Mass.

PUMPS (Ballast)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Bilge)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Boiler Feed)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Centrifugal)
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Direct Acting)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Fuel Oil)
Coen Co., 610 S. Broadway, Los Angeles, Cal.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Power)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Steam)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Pump & Machinery Co., Harrison, N. J.

PUMPS (Vacuum)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Worthington Pump & Machinery Co., Harrison, N. J.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

PURIFIERS (Oil)
Sharples Specialty Co., Westmoreland, Philadelphia, Pa.

RADIO COMPASS AND DIRECTION FINDER
Radiomarine Corp. of America, 66 Broad St., New York City.

RADIO EQUIPMENT
Radiomarine Corp. of America, 66 Broad St., New York City.

RAFTS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N Y.

RAILWAY DRY DOCKS
Crandall Engineering Co., Cambridge, Mass.

RANGES
Stamford Foundry Co., Stamford, Conn.

REFRIGERATING MACHINERY
Brunswick-Kroeschell Co., New Brunswick, N. J.
Ingersoll-Rand Co., 11 Broadway, New York City

REPAIRS
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Maryland Dry Dock Co., Baltimore, Md.

REPAIRS (Electric)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

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American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. 2435, Montreal, Can.
Chicago Shipbuilding Co., So. Chicago, Ill.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City

REPAIRS (Marine Engine)
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.

REPAIRS (Turbine)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REVOLUTION COUNTERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

RIVETS
Wrought Iron Co. of America, Lebanon, Pa.

RINGS (Steel)
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

ROLLS (Steel)
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

ROPE (Transmission)
Columbian Rope Co., Auburn, N. Y.

ROPE OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

RUBBER TILE
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

RUST PREVENTATIVE (Oil)
Vacuum Oil Co., 61 Broadway, New York City.

SAFETY VALVES (Marine)
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

SCHOONERS (Auxiliary)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Toledo Shipbuilding Co., Toledo, O.

SEARCHLIGHTS (High Intensity)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SEARCHLIGHTS (Incandescent and Arc)
General Electric Co., Schenectady, N. Y.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SELF UNLOADING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

SEPARATORS (Oil)
Babcock & Wilcox Co., 85 Liberty St., New York City.
Sharples Specialty Co., Westmoreland, Philadelphia, Pa.

SHAFT COVERING
Paper & Textile Machinery Co., The, Sandusky, Ohio.

SHEAR BLADES & KNIVES
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

SHEETS (Blue Annealed)
Alan Wood Steel Co., Conshohocken, Pa.

SHIPBUILDERS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. Box 2430, Montreal, Can.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

SHIPBUILDING SYSTEMS
Isherwood, J. W., & Co., Ltd., 17 Battery Place, New York City.

SHIP STABILIZERS
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SIGNALS (Submarine)
Submarine Signal Co., 160 State St., Boston, Mass.

SKID PLATFORMS (Lift Truck)
Truscon Steel Co., Pressed Steel Div., Youngstown, O.

SLEEVES (Rubber)
Paper & Textile Machinery Co., The, Sandusky, Ohio.

SOLDERING IRONS (Acetylene)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

SOUNDING MACHINES
Submarine Signal Co., 160 State St., Boston, Mass.

SPRINGS (Box, Bed)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

SPUN OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Lines, 39 Broadway, New York City.

STEAM GAGES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

STEAM TRAPS
Davis Engineering Co., 90 West St., New York City.

STEEL (Electric Induction)
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

STEEL BARGES—See BARGES (Steel)

STEEL TANKS
Brunswick-Kroeschell Co., New Brunswick, N. J.

STEERING ENGINES
Hyde Windlass Co., Bath, Me.

STEERING GEARS
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.

STORAGE BATTERIES—See BATTERIES

STOVES
Stamford Foundry Co., Stamford, Conn.

STRAINERS (Oil)
Coen Co., 610 S. Broadway, Los Angeles, Cal.

SWITCHBOARDS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

TANKS (Acetylene Gas)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

TELEMOTORS
Hyde Windlass Co., Bath, Me.

TELEMOTORS (Hydraulic & Electric)
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.

TORSION METERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.

TOWING
Moran Towing & Transportation Co. 17 Battery Place, New York City.

TOWING & MOORING ENGINES
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.

TOWING LINES
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co., 46 South St., New York City.

TRACTORS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

TRANSMISSION (Rope)—See ROPE (Transmission)

TREADS (Safety)
Dravo-Doyle Co., Pittsburgh, Pa.

TREADS (Steel Stair & Ladder)
Alan Wood Steel Co., Conshohocken, Pa.

TRUCKS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

TUBES (Condenser)
Scovill Mfg. Co., Waterbury, Conn.

TURBINES (Electric)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Marine)
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Steam)
DeLaval Steam Turbine Co., Trenton, N. J.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TWINE AND ROPE
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Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

VALVES AND FITTINGS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.

VENTILATING EQUIPMENT
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WATER PURIFICATION SYSTEMS
Griscom-Russell Co., 285 Madison Ave., New York City.

WELDERS (Electric Arc)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

WELDING & CUTTING APPARATUS (Oxy, Acetylene, Oxy-Gas)
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WELDING GAS
Prestolite Co., The, Inc., 30 E. 42nd St., New York City

WELDING SUPPLIES
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WHISTLES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass

WINCHES
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WINDLASSES
American Engineering Co., Cumberland & Arimingo Sts., Philadelphia, Pa.
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WINDOWS (Balanced Frameless)
Kearfoot Engineering Co., 117 Liberty St., New York City.

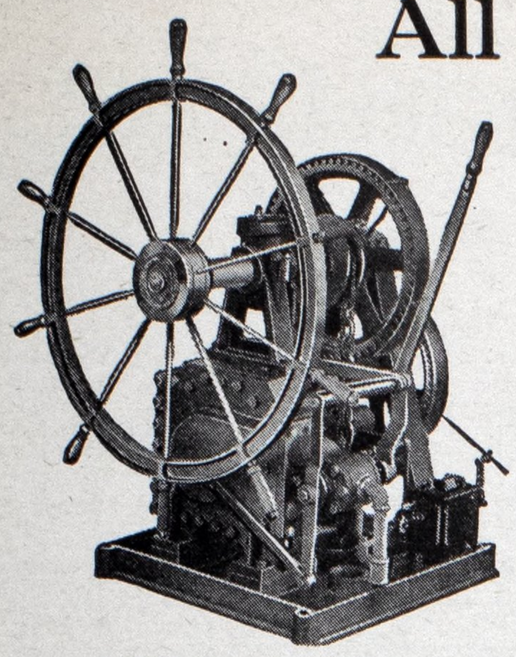
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Radiomarine Corp. of America, 66 Broad St., New York City.

WIRELESS SETS AND APPARATUS
Radiomarine Corp. of America, 66 Broad St., New York City.

WORKBOATS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn.

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All Over the Lakes They're Using Dake's

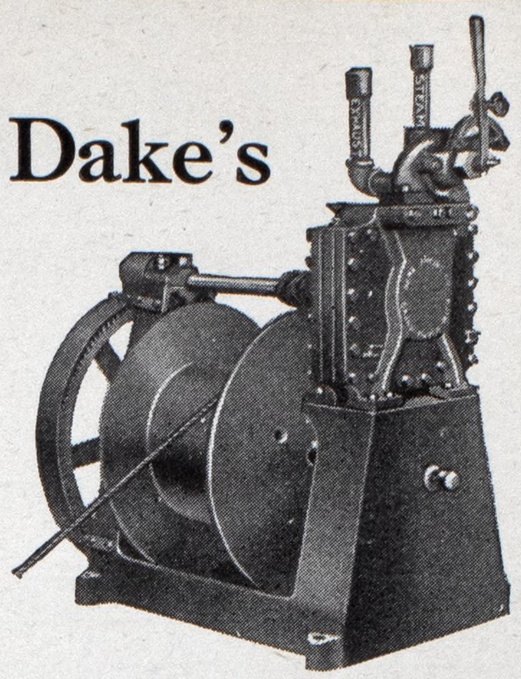


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Snub Line Winch

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Star Brass Mfg. Co.

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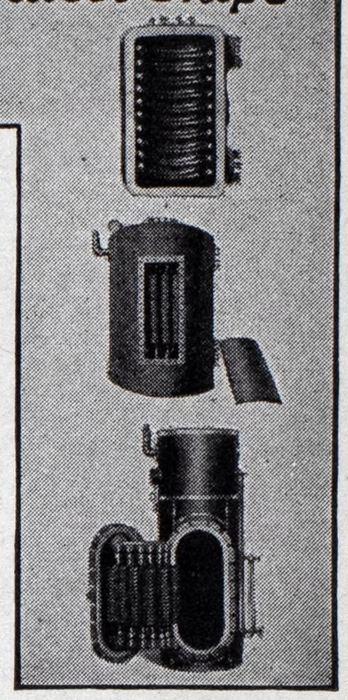
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Marine Insurance Agents

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Incorporated

Steamship Owners, Agents and Brokers

11 Broadway—New York

Statement of the ownership, management, circulation, etc., required by the act of congress of Aug. 24, 1912, of MARINE REVIEW published monthly at Cleveland, Ohio, for April 1, 1930. State of Ohio, county of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared C. J. Stark, who, having been duly sworn according to law, disposes and says that he is the President of MARINE REVIEW, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, embodied in section 411, Postal laws and regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Penton Publishing Co., Cleveland, O. Editor, A. H. Jansson, Cleveland, O. Advertising Director, J. D. Pease, Cleveland, O., Circulation manager, none. 2.—That the owners are: Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: The Penton Publishing Co., Cleveland, O.; John A. Penton, Cleveland, O.; C. J. Stark, Cleveland, O.; J. D. Pease, Cleveland, O.; F. V. Cole, Cleveland, O.; J. R. Dawley, Cleveland, O. 3.—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. 4.—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. C. J. Stark. Sworn to and subscribed before me this 24th day of March, 1930. (Seal) H. L. Richey. (My commission expires May 7, 1930.)

*



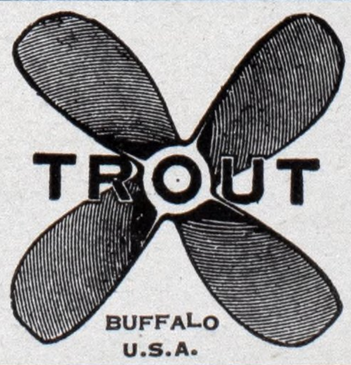
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Six words must be added for box address.

To insure insertion, advertisements must reach us by the 10th of the month.

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WANTED
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28′ x 70′ x 5′
32′ x 80′ x 6′
Above dimensions approximate
Scows must be located Lake Erie or Lake Ontario
The R. C. Huffman Construction Co.
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Cleveland, O.

WANTED TO BUY. DERRICK SCOW about 35 x 100 feet or larger on Great Lakes. Steel preferred. Derrick capacity of 25 tons or more. Address Box 414, MARINE REVIEW, Cleveland, Ohio.

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For Sale or Charter
The Central Dredging Co.
Chicago

FOR SALE:—S. S. SPORT, AUTOMOBILE Ferry, Side Wheeler, Length 90′1″, Beam 24 Ft., Capacity 8 cars. Apply to W. Bingley & Son, Ltd., Cornwall, Ont., Canada.

FOR SALE: STEEL BARGE H. C. M. NO. 9, Length 92 ft., Beam 24 ft., Depth 8 ft., Tonnage 170 Gross. Apply to W. Bingley & Son, Ltd., Cornwall, Ont., Canada.

5000 TON STEAMER
For Sale
S. S. ROCKEFELLER
located Toledo, Ohio
Fine Condition
The Central Dredging Co.
Chicago

For Sale

FOR SALE: MARINE ENGINES AND boilers of all sizes; light draft wooden and steel tug boats for sale or charter; derrick boats, deck scows and lighters for sale or charter. Cowles Towing Co., Buffalo, N. Y.

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FOR SALE OR CHARTER
Tug "Burger." For particulars address R. G. Evans, Cheboygan, Mich.

MOTOR TUG—WOOD—400 IHP BOLINDER engine—82 ft. by 20.6—built 1924—Going condition—Rutland's Maritime Exchange, 82 Wall Street, New York.

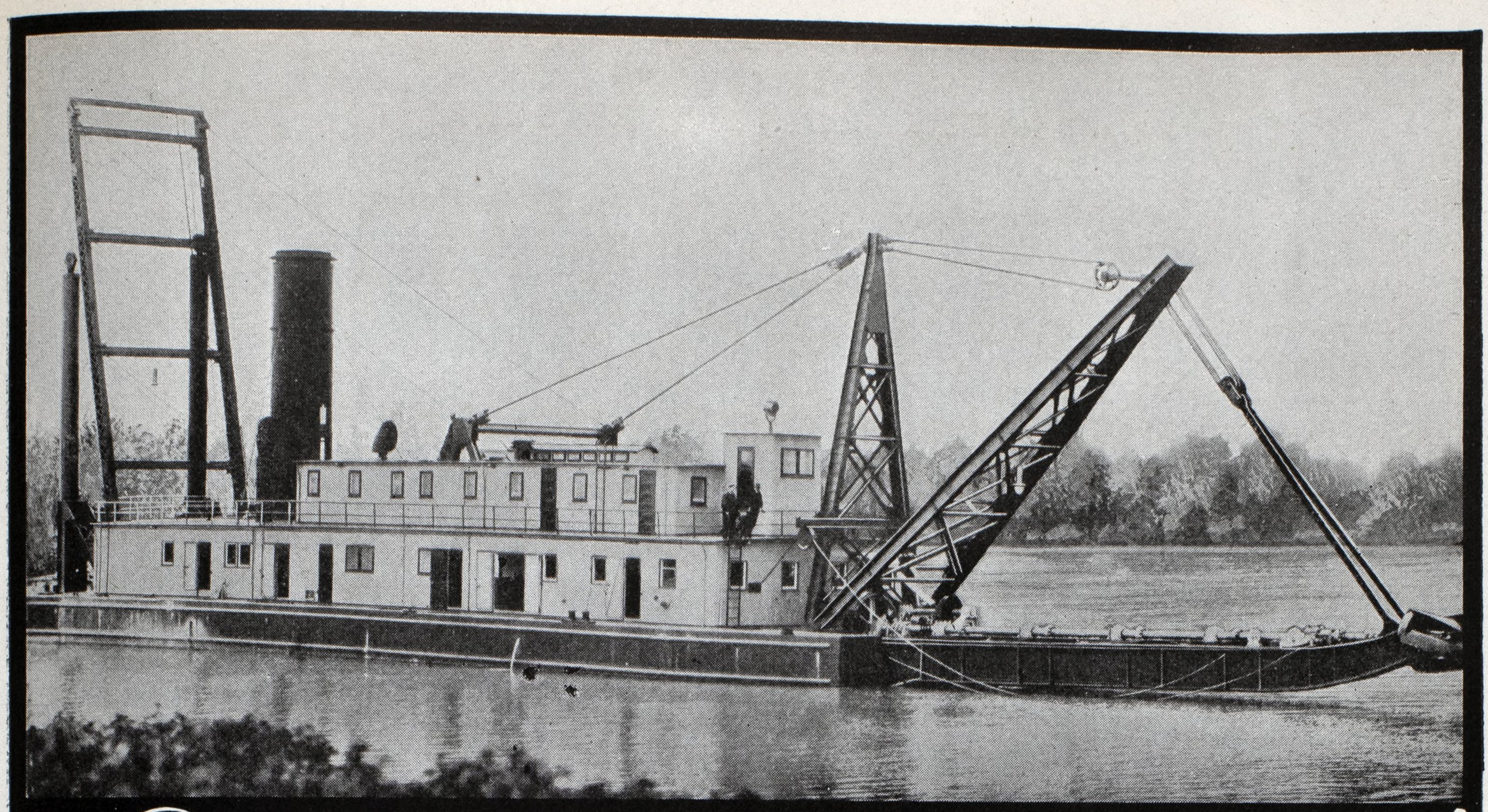
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A Cooper-Bessemer Diesel solved the problem. Last year the steam equipment was replaced with a 1500 H. P. Cooper-Bessemer Diesel direct-connected to a 20″ suction dredge pump and the capacity of the "Primrose" was practically doubled. During the past year this dredge has consistently maintained a production of 15,000 yards per 24 hours, at a velocity of 34 ft. per second through a 5000 to 6000 foot pipe line.

And during this time the Cooper-Bessemer Diesel engine has lived up to its owner's fondest expectations of performance in every respect. The simplicity of its operation is indicated by the fact that the chief operating engineer, an experienced steam engineer who had no knowledge of Diesel engines whatsoever prior to his taking over the Cooper-Bessemer, has experienced no major difficulties in its operation.

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It will pay you to investigate Cooper-Bessemers for *your* marine work.

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General Diesel Sales Offices: Suite 301, 25 W. 43rd St., New York City

Plants: Grove City, Pa.; Mt. Vernon, Ohio

Canadian Diesel Representative: Diesel Power Ltd., 129 Adelaide St. West, Toronto, Ont., Canada

COOPER-BESSEMER
DIESEL MARINE ENGINES

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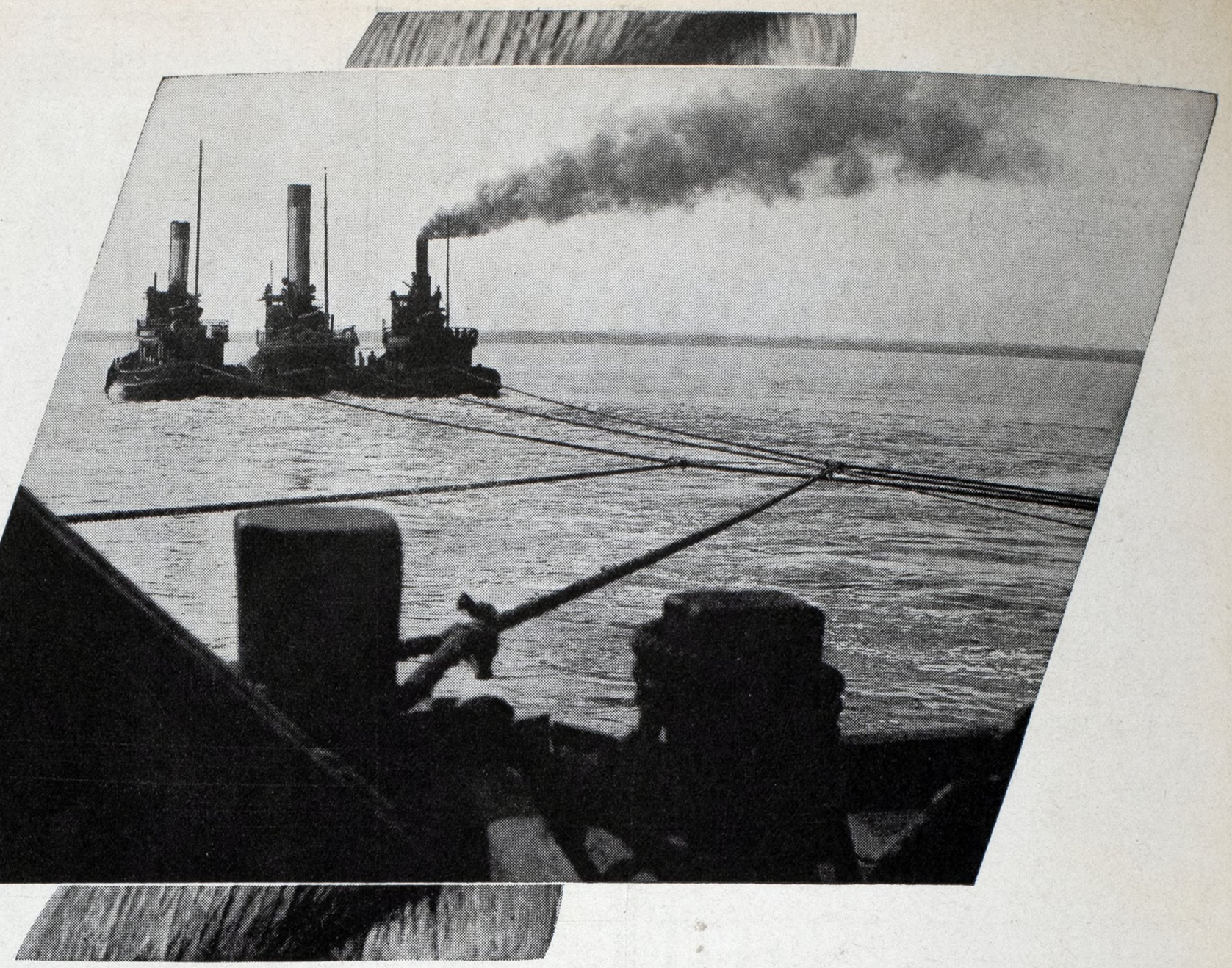
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FOR YOUR HARDEST JOBS



Columbian Tow-Ro, a line that specializes in towing—that's all it knows how to do, and how it does it!

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Newport News

The Largest and Highest Powered American—Built Liners

THE insistent demand for increased speed in transportation is by no means confined to rail, highway and air travel. All the leading maritime nations are busily engaged on new ship designs to gratify the public's desire for faster ocean service.

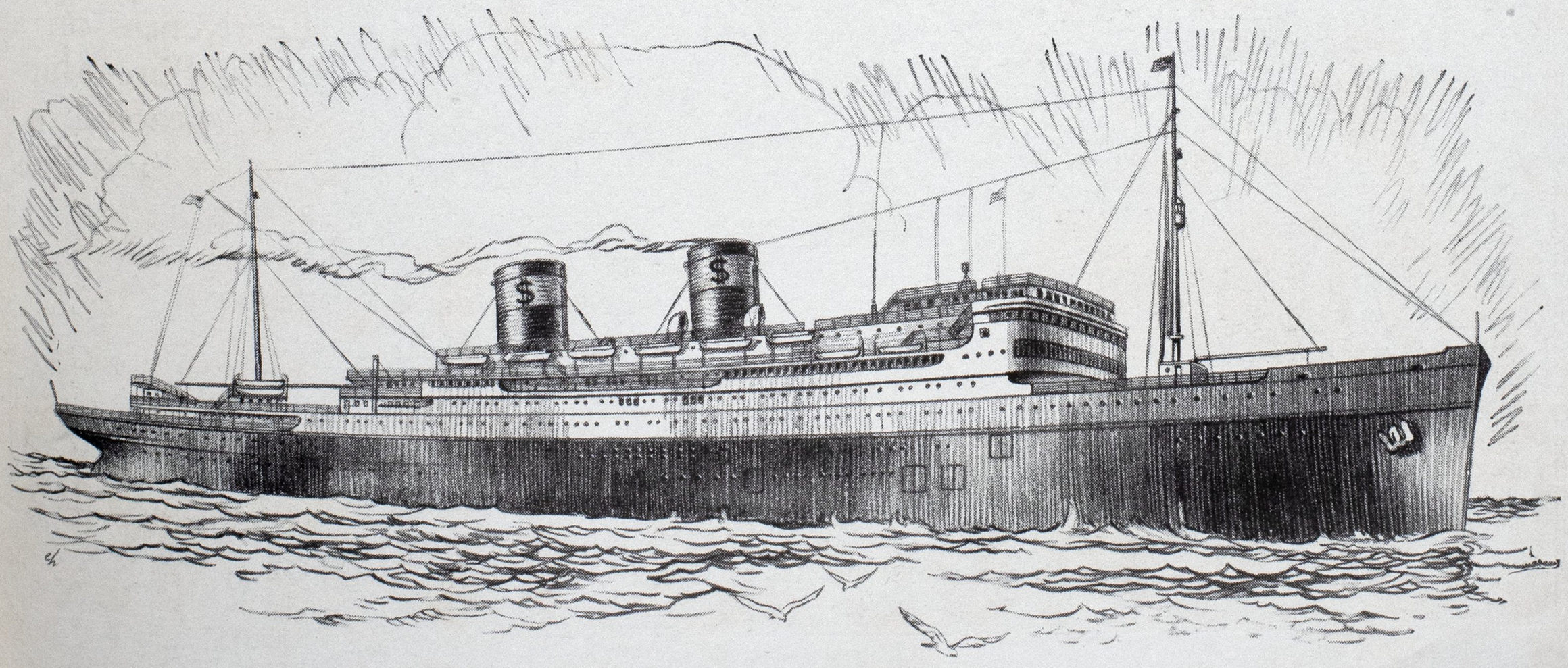
American steamship companies are wide awake to the present day requirements. Two of the largest and highest powered liners so far built in the United States are now under construction at Newport News.

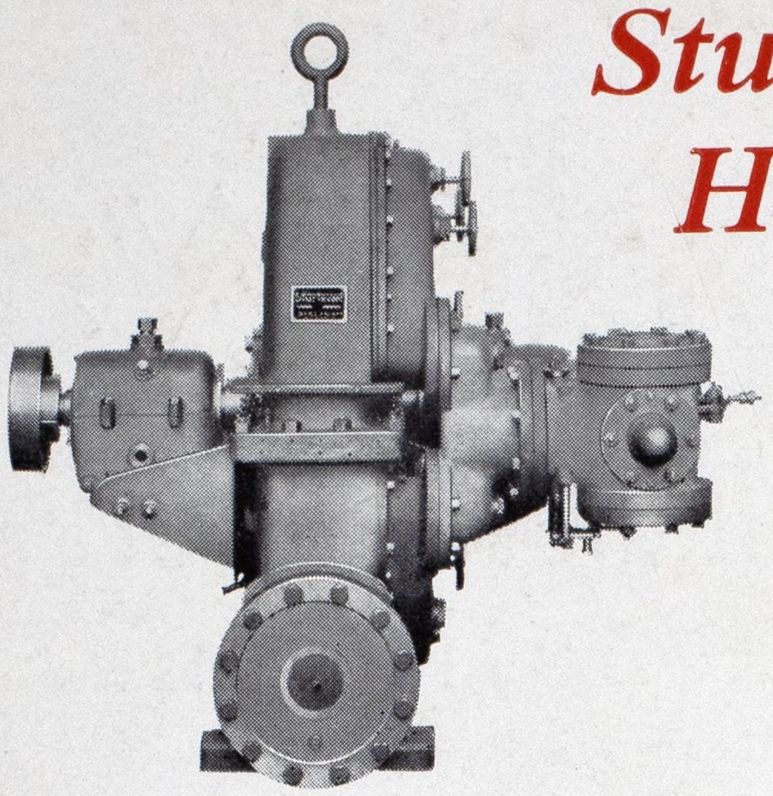
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"SHIPS OF CHARACTER"

Newport News Shipbuilding and Dry Dock Company

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S. S. "A. F. HARVEY" owned by Pittsburgh Steamship Co. and built by Great Lakes Engineering Works.

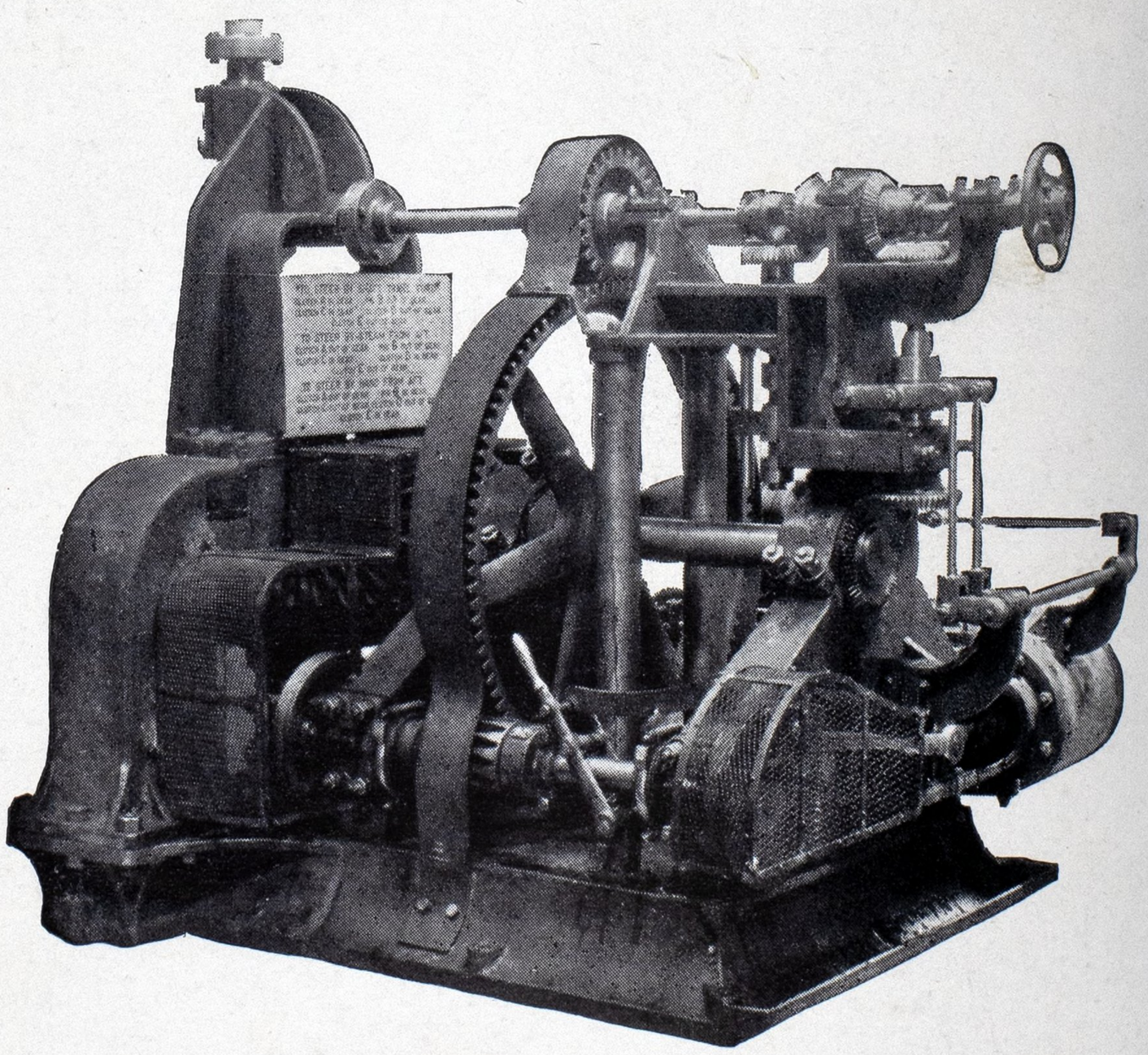
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These three fine new boats are all equipped with

Hyde

Quadrant Type Steering Gear
Spur Gear Windlass
Mooring Winches
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HYDE Quadrant Type Steering Gear

Hyde Windlass Company

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